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SUMMARY

This document describes all test work and test results for EWA 5-593 (Reference F).

These tests were conducted to evaluate the strength, flexibility, and sonic and thermal fatigue resistance of superalloy corrugated skin panels and the attachments of non-insulated and insulated panels to primary structures.

Panels with various methods of attachment to primary structure were evaluated. They are identified below, by their respective Boeing drawing numbers. Solution treated and aged Rene' 41 was utilized for all panel skins, corrugations, stand-offs, and attachment clip details.

25-20352	Two non-insulated panels 23 by 36 inches were fabricated with "omega" groove breathers every six inches running in the 23" direction in an otherwise flat skin. The skin was spot welded to corrugations. Flexible clips on long edges were utilized as the attachment technique. The panels were subjected to cyclic thermal fatigue and combined shear and pressure environments.
25-20344-1	Three non-insulated panels 23 by 18 inches, constructed identical to panels 25-20352 except for width, were subjected to sonic tests.
25-20369-1	Three insulated panels 23 by 17 inches were constructed with Rene' 41 heat shields substituted for a refractory alloy heat shield. Shield attachment to the corrugations was effected by riveting shields and corrugations to intermediate one inch long stand-off clips. A 0.25 inch layer of Fiberfrax insulation separated the shields and the corrugations. Attachment to primary structure was accomplished by flexible clips on opposite short sides of the panel. These panels were subjected to a sonic environment.
25-20369-2	Three panels similar to 25-20369-1 except insulation was Q-felt and attachment was by direct spot welding of panel to edge beams which were supported on flexible end fittings. Sonic tests were conducted on these panels.
25-20370-1	Two non-insulated panels 23 by 36 inches, utilizing shallow protruding beads for expansion in the long direction and for increased skin stiffness in the short direction, were constructed with the skin spot welded to corrugations. This panel was bolted to beams which utilized flexible fittings at corners for attachment to primary structure. This panel was subjected to thermal, shear, and pressure tests.
25-20370-2*	This panel was the same as 25-20370-1 except that six hat section stiffeners running in the long direction were riveted

* This is not Boeing part no. 25-20370-2. It is modified 25-20370-1.

to the corrugation crests to increase panel stiffness. This panel was subjected to thermal and pressure tests.

25-20374 Two 23 by 36 inch panels consisted of corrugations and were constructed to simulate the structural portion of an insulated panel and its attachments under shear and pressure and thermal conditions. Attachment techniques utilized consisted of integral beams on the long sides and flexible fittings at corners.

Thermal tests included symmetrical and unsymmetrical heating at various heating rates to temperatures of 1870° F. Sonic tests subjected panels to 152.5 db overall. Pressure tests were conducted to ultimate load. Shear tests were conducted to induce ⅛ inch of shear deflection of the panel across the 23" edge.

Test data are summarized in the form of graphs and tabulated data. Photographs of specimens and test setups are included.

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FIGURE INDEX (Continued)

FIGURE INDEX (Continued)

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1.0 INTRODUCTION

1.1 Background

This test program was conducted to evaluate non-insulated surface panels and the structural part of insulated panels under simulated conditions of re-entry load and environment. The concept of reliance on high temperature integrity of the panel material for sustained load-carrying capacity under aerodynamic heating distinguishes these structures from those employing cooling techniques. The panels tested were made of heat-treated Rene' 41.

1.2 Objectives

It was required to determine the effects on the panels of noise environments, cyclic heating, thermal gradients, and shear and pressure loads.

1.2.1 Sonic tests were conducted on some of the test panels in order to record the behavior of the panels to the environmental sonic conditions encountered in flight. Measurement of sound pressure level and panel motion was required for these tests.

1.2.2 A series of thermal fatigue tests, with heat applied to the outer surfaces of the panels producing a temperature gradient across the panel thickness, simulated cyclic re-entry heating. In these tests, observation of damage and measurement of deflection due to differential growth between inner and outer surfaces were required.

1.2.3 In other tests the panels were subjected to unsymmetrical heat distribution over the surface, to determine the effects of unequal edge expansion on webs and attachments.

1.2.4 The pressure tests were run to obtain ultimate pressure loads at room and elevated temperatures required to cause failure of panel corrugations and/or edge attachments.

1.2.5 In each shear test, measurement of the load necessary to produce a one-quarter inch shear deformation in the panel web was required, as well as a record of resulting damage.

2.0 TEST SPECIMEN AND INSTRUMENTATION

2.1 Test Specimen, Dwg. 25-20369-1 (Reference, Figure 229).

2.1.1 Three test insulated panels were fabricated with a flat .010" erosion shield with overall dimensions of 23.35" x 17.0". Two grooves running parallel to the 23.35" sides were formed into the shield at 1/3 span points.

2.1.2 Eleven corrugations with a pitch of 1.50" and a .75" depth were formed from a sheet of .008" material.

2.1.3 A sheet of Inconel 200 mesh wire cloth (.002" x 16.2" x 12.0") was installed between the corrugations and 1/2" Fiberfrax insulation.

2.1.4 The shield, wire cloth, Fiberfrax and corrugations were riveted together with Z clip spacer attachments.

2.1.5 Three clips were located at each end of the 17.5" edge for mounting purposes.

2.1.6 The skin, clips and corrugations were Rene' 41 (J 1610) BMS 7-95 material.

2.1.7 Photographs of a typical panel are on Figures 1 and 2, Volume I.

2.2 Test Specimen Dwg. 25-20369-2

2.2.1 Panel 25-20369-2 was similar to 25-20369-1 except for mounting support configuration, use of stabilized Q-felt insulation, and use of Inconel foil instead of mesh. Three test panels were fabricated.

2.2.1.1 One end of the panel was constructed with corner tabs for mounting.

2.2.1.2 Flexible tabs were spotwelded and bolted to the channel in a horizontal and vertical position. These tabs were designed to accept loads only in their respective planes.

2.2.1.3 A metallic foil seal extending outward 1.5" from the panel was attached across the 17.0" ends.

2.2.1.4 A sheet of .004" Inconel foil was installed between the corrugations and stabilized Q-felt insulation.

2.2.2 Photographs of a typical panel are shown on Figures 3 and 4, Volume I.

2.3 Test Specimen, Dwg. 25-20344-1 (Reference, Figure 230).

2.3.1 The panel was fabricated with a flat .008" skin which was spot-welded to a corrugated .010" stiffener web. The web had twelve parallel corrugations 0.75" high spaced 1.50" apart.

2.3.2 Overall dimensions were 23.35" x 17.50".

2.3.3 Three clips were located at each end of the 17.50" edge for mounting purposes.

2.3.4 The skin and corrugations were Rene' 41 (J 1610) BMS 7-95 material.

2.3.5 Photographs of the panel are shown on Figures 5 and 6, Volume I.

2.4 Test Specimen, Dwg. 25-20374-1 (Reference Figure 231)

2.4.1 Panel was fabricated from a corrugated .008 Rene' 41 skin with overall dimensions 23.40" x 35.16".

2.4.2 Panel contained 23 corrugations .75" high on 1.50" centers.

2.4.3 Formed .030" channel support beams were spotwelded to the corrugations and to .02" clips which in turn were spotwelded to the corrugated panel along the 35.16" sides. Twelve clips per side were used.

2.4.4 Tabs were spotwelded to the ends of one support beam, parallel to the 35.16" edge of the panel.

2.4.5 A .002" Inconel 702 foil seal was seamwelded around four sides, extending 2.7" beyond the 35.16" sides and 1.6" beyond the 23.40" sides.

2.4.5.1 The foil seal was folded and pleated to fit around the corrugations.

2.4.6 Seven .02" electronic deflection indicator clips were spotwelded to the panel; one at each corner, one at the center of each 35.16" side, and one at the center of the panel.

2.4.7 Three .020" x .50" x 1.0" channels were bolted to the support beams.

2.4.8 The corrugations, clips and support beams were Rene' 41 (J 1610) BMS 7-95 material.

2.4.9 Photographs of the panel are on Figures 7 and 8, Volume I.

2.5 Test Specimen, Dwg. 25-20374-2

2.5.1 Panel 25-20374-2 was identical to panel 25-20374-1.

2.6 Test Specimen, Dwg. 25-207[illegible]0-1 (Reference Figure 232)

2.6.1 The test panel was fabricated with a flat .008" skin with overall dimensions of 23.35" x 36.00". Twenty-three beads, .06" high, and on 1.50" centers were formed into it.

2.6.2 Twenty-three corrugations, with a pitch of 1.50" and a .75" depth, were formed from a sheet of .008" material and spotwelded to the beaded skin.

2.6.3 Channels, formed of .030 material, were bolted to the 36.00" edges of the panel.

2.6.4 Two .060" attachment plates, one on each end of one channel and parallel to the 36.00" side, were attached to the channel.

2.6.5 Electronic deflection indicator clips were spotwelded to the panel at six locations.

2.6.6 Skin, corrugations, channels, clips and attachment plates were made from Rene' 41 (J 1610) BMS 7-95 material.

2.6.7 Photographs of the panel are on Figures 9, 10 and 11, Volume I.

2.7 Test Specimen, Dwg. 25-20370-2

2.7.1 Panel 25-20370-2 was identical to panel 25-20370-1, except that the panel was modified for two tests, LT-5593-2-6B and -4-4.

2.7.1.1 Six hat-section stiffeners were riveted to the corrugation crests to increase panel rigidity.

2.7.1.2 A photograph of the modified panel is shown on Figure 12, Volume I.

2.8 Test Specimen, Dwg. 25-20352-1 (Reference, Figure 233).

2.8.1 The test panel was fabricated with a .008" skin into which five creases, .20" deep, and on 6.00" centers, were formed. Overall finished dimensions were 36.00" x 23.35".

2.8.2 Twenty-three corrugations, with a pitch of 1.50" and a .75" depth, were formed from a sheet of .008" material and spotwelded to the creased skin.

2.8.3 Six .020" support clips were spotwelded and riveted to each 36.00" side.

2.8.4 Two formed channels, .032" x 2.00" x .75", were bolted to the support angles parallel to the 36.00" sides.

2.8.5 Skin, corrugations, support angles and channels were made from Rene' 41 (J 1610) BMS 7-95 material.

2.8.6 Photographs of the panel are shown on Figures 13 and 14, Volume I.

2.9 Test Specimen, Dwg. 25-20352-2

2.9.1 Panel 25-20352-2 was identical to panel 25-20352-1 except the two .032" x .75" x 2.00" channels were not included.

2.9.2 Photographs of the panel are shown on Figures 15 and 16, Volume I.

2.10 INSTRUMENTATION

2.10.1 Test LT-5593-1 Sonic Test (Panels 25-20344 and 25-20369-1, -2)

2.10.1.1 Two Altec 21 BR-200 microphones were used to monitor the sound level.

2.10.1.1.1 One microphone was placed inside the progressive wave chamber to monitor the sound level at the face of the specimen.

2.10.1.1.2 The second microphone was located on the opposite side of the specimen external to the progressive wave chamber.

2.10.1.2 Three non-contact deflection pickups were used to monitor the RMS deflections of the panel.

2.10.1.2.1 One deflection pickup was mounted along the centerline of the 23.5" edge at 1/4 point.

2.10.1.2.2 A second deflection pickup was along the centerline of the 17.5" edge at 1/4 point.

2.10.1.2.3 A third deflection pickup was mounted at the center of the panel.

2.10.1.3 Photographs showing microphone and deflection pickups are shown on figures 17 and 18, Volume I.

2.10.1.4 The test panels were instrumented with 6 chromel-alumel control thermocouples for the heating cycle phase of the test. See Figure 65, Volume I.

2.10.2 Test LT-5593-2 Thermal Cycle Tests

2.10.2.1 Test LT-5593-2-1 (Panel 25-20374-1)

2.10.2.1.1 Fifty-four chromel-alumel thermocouples were spotwelded to the panel and beaded seals. See Figures 66, 67 and 68, Volume I.

2.10.2.1.2 Electronic deflection indicators were attached at seven locations to measure vertical deflections. Locations are shown on Figure 69, Volume I.

2.10.2.1.3 Electronic deflection indicators were attached at three locations to measure horizontal deflections at the ends and midpoint of one 35.6" side.

2.10.2.2 Test LT-5593-2-2 (Panel 25-20374-2)

2.10.2.2.1 Eleven chromel-alumel thermocouples were spotwelded to the panel. Thermocouple locations are shown on Figure 70, Volume I.

2.10.2.2.2 Electronic deflection indicators were attached at five locations to measure vertical deflections. Locations are shown on Figure 71, Volume I.

2.10.2.3 Test LT-5593-2-3 (Panel 25-20352-1 and 25-20374-1)

2.10.2.3.1 Ten chromel-alumel thermocouples were spotwelded to the 25-20352-1 panel, as shown on Figure 72, Volume I.

2.10.2.3.2 Eight chromel-alumel control thermocouples were spotwelded to the 25-20374-1 panel as shown on Figure 73, Volume I.

2.10.2.3.3 Electronic deflection indicators were attached at five locations as shown on Figure 74, Volume I. Quartz rods were used to actuate the electronic deflection indicators D02, D04 and D06.

2.10.2.4 Test LT-5593-2-4 (Panel 25-20352-2)

2.10.2.4.1 Instrumentation for this test was identical to that for LT-5593-2-3.

2.10.2.5 Test LT-5593-2-5 (Panel 25-20370-1)

2.10.2.5.1 Instrumentation for this test was identical to that for LT-5593-2-3.

2.10.2.6 Test LT-5593-2-6 (Panel 25-20370-2)

2.10.2.6.1 Instrumentation for this test was identical to that for LT-5593-2-3.

2.10.2.7 Test LT-5593-2-6B (Panel 25-20370-2)

2.10.2.7.1 Ten chromel-alumel monitor thermocouples were spotwelded to the panel in the locations shown on Figure 75, Volume I.

2.10.2.7.2 Seven chromel-alumel control thermocouples were spotwelded to the panel in the locations shown on Figure 75, Volume I.

2.10.2.7.3 Five electronic deflection indicators were attached to the panels as shown on Figure 76, Volume I.

2.10.3 Test LT-5593-3 <u>Shear Tests</u>

2.10.3.1 Test LT-5593-3-1 (Panel 25-20374-1)

2.10.3.1.1 Eleven chromel-alumel monitor thermocouples were spotwelded to the panel in the locations shown on Figure 77, Volume I.

2.10.3.1.2 Nine chromel-alumel control thermocouples were spotwelded to the panel in the locations shown on Figure 78, Volume I.

2.10.3.1.3 Five electronic deflection indicators were attached to the panel at the locations shown on Figure 78, Volume I to measure vertical deflections.

2.10.3.2 Test LT-5593-3-2 (Panel 25-20352-2)

2.10.3.2.1 Thermocouple installations and locations were identical to those of Test LT-5593-3-1.

2.10.3.2.2 Eight electronic deflection indicators were attached at the four panel corners as shown on Figure 79, Volume I.

2.10.3.3 Test LT-5593-3-3 (Panel 25-20370-1)

2.10.3.3.1 Thermocouple installations and locations were identical to those of Test LT-5593-3-1.

2.10.3.3.2 Eight electronic deflection indicators were attached to the panel at three corners as shown on Figure 80, Volume I.

2.10.4 Test LT-5593-4 Pressure Tests

2.10.4.1 Test LT-5593-4-1 (Panel 25-20374-1)

2.10.4.1.1 Thermocouple installations and locations were identical to those of Test LT-5593-3-1.

2.10.4.1.2 Five electronic deflection indicators were attached to the panel at the locations shown on Figure 78, Volume I.

2.10.4.2 Test LT-5593-4-2 (Panel 25-20374-2)

2.10.4.2.1 Eleven chromel-alumel monitor thermocouples were spotwelded to the panel in the locations shown on Figure 77, Volume I.

2.10.4.2.2 Nine chromel-alumel control thermocouples were spotwelded to the panel as shown on Figure 78, Volume I.

2.10.4.2.3 Five electronic deflection indicators were attached to the panel at the locations shown on Figure 78, Volume I.

2.10.4.3 Test LT-5593-4-3 (Panel 25-20352-1)

2.10.4.3.1 Thermocouple installations and locations, and electronic deflection indicator attachment locations are identical to those of LT-5593-4-2.

2.10.4.4 Test LT-5593-4-4 (Panel 25-20370-2)

2.10.4.4.1 Thermocouple installations and locations, and electronic deflection indicator attachment locations are identical to those of LT-5593-4-2.

2.10.4.5 Test LT-5593-4-5 (Panel 25-20352-2)

2.10.4.5.1 Electronic deflection indicator number and location was identical to that of LT-5593-4-2.

2.10.4.5.2 No thermocouples were used as this test was at room temperature.

2.10.4.6 Test LT-5593-4-6 (Panel 25-20370-1)

2.10.4.6.1 Electronic deflection indicator number and location was identical to that of LT-5593-4-2.

2.10.4.6.2 No thermocouples were used as this test was at room temperature.

2.10.5 Test LT-5593-5 Sonic Test (Panel 25-20344)

2.10.5.1 Four Altec 21BR-200 microphones were used to monitor sound level.

2.10.5.1.1 The microphones were located as follows:

Microphone	Location
1	Center of 24" edge nearest horn with panel in 0° position.
2	Center of panel - outside face.
3	Center of 24" edge farthest from horn with panel in 0° position.
4	Center of panel - inside anechoic box.

2.10.5.2 Three non-contact deflection pickups were used to monitor the RMS deflections of the panel in an identical manner to that used in LT-5593-1.

3.0 TEST SETUP

3.1 Test Setup for LT-5593-1

3.1.1 Sonic test panels 1477, 1478, 1479 (Panels 25-20344) were mounted through the end clips to a pair of .040 gage Rene' 41 channels with 3/16" dia. bolts. The Rene' 41 channels in turn were attached at each end by 1/2" dia. bolts to the steel frame around the 24" opening in the progressive wave test chamber. The 23.5" edge of the specimens was unsupported.

3.1.2 Two Altec-Lansing Model 6786 electro-pneumatic transducers mounted at the throat of the progressive wave chamber served as the sound source. The electrical signal to the transducers was provided by an Allison 3MAN9 noise generator and octave band equalizer through a dual channel McIntosh amplifier. Refer to Figure 19, Volume I, for a photograph of the sonic test setup.

3.1.3 Sonic test panels No. 1493, 1494, and 1495 (panels 25-20369-1) were mounted through the end clips to a pair of .040 gage Rene' 41 channels with 3/16" dia. bolts. The Rene' 41 channels were attached at each end by a 1/2" dia. bolt to the steel frame of the 24" opening in the progressive wave chamber. The 23.35" edge was unsupported.

3.1.4 Sonic test panels No. 1497, 1498, and 1499 (panels 25-20369-2) were mounted at one end by bolting a .040 Rene' channel with six 3/16' bolts to the three tabs provided. Each end of the channel was then bolted to the frame of the test chamber with two 1/2" bolts. The opposite end of the panel (17.0" edge) was secured to the test frame by flexible plates in horizontal and vertical positions. The edge of the foil seal was clamped between the test frame and a 1/4" x 1/4" bar with five 5/32" bolts. See Figure 20, Volume I, for mounting details.

3.1.5 Four Altec-Lansing Model 6786 electro-pneumatic transducers mounted at the throat of the progressive wave chamber served as the sound source. The electrical signal to the transducers was provided by an Allison 3MAN9 noise generator and octave band equalizer through a dual channel McIntosh amplifier.

3.2 Test Setup for LT-5593-2

3.2.1 Test Setup for LT-5593-2-1 (Panel 25-20374-1)

3.2.1.1 The test panel was mounted on a vacuum box lined from top to bottom with 2.5" thick K-30 insulation brick. A sketch of the box is shown on Figure 82, Volume I. A photograph of the panel installation is on Figure 21, Volume I.

3.2.1.2 Two 25-20344 panels were placed 10.6" below the test panel in the vacuum box to simulate a proposed upper wing panel.

3.2.1.3 Thirty-seven high density radiant heat lamps were mounted above the test panel and were controlled from eight zones, shown on Figure 78, Volume I. The lamp locations are shown on Figure 81, Volume I.

3.2.1.4 A beaded seal was spotwelded to the box as shown on Figure 22, Volume I.

3.2.1.5 An overall view of the specimen test setup is shown on Figure 23, Volume I.

3.2.2 Test Setup for LT-5593-2-2 (Panel 25-20374-2)

3.2.2.1 This test setup was identical to the one used for LT-5593-2-1, except a 2.0" thick layer of Fibre Frax batt was placed approximately two inches below the support channels of the test panel.

3.2.3 Test Setup for LT-5593-2-3 (Panel 25-20352-1)

3.2.3.1 The test panel was mounted below a re-radiating panel as shown on Figures 82 and 24, Volume I.

3.2.3.2 The heat lamp setup and arrangement was identical to that of LT-5593-2-1.

3.2.4 Test Setup for LT-5593-2-4 (Panel 25-20352-2)

3.2.4.1 Test panel mounting and heat lamp setups were identical to those of LT-5593-2-3.

3.2.5 Test Setup for LT-5593-2-5 (Panel 25-20370-1)

3.2.5.1 Test panel mounting and heat lamp setups were identical to those of LT-5593-2-3.

3.2.6 Test Setup for LT-5593-2-6 (Panel 25-20370-2)

3.2.6.1 Test panel mounting and heat lamp setups were identical to those of LT-5593-2-3.

3.2.7 Test Setup for LT-5593-2-6B (Panel 25-20370-2)

3.2.7.1 The test panel was mounted in the vacuum box as shown on Figure 83, Volume I.

3.2.7.2 The heat lamp setup and arrangement was identical to that of LT-5593-2-1.

3.3 Test Setup for LT-5593-3

3.3.1 Test Setup for LT-5593-3-1 (Panel 25-20374-1)

3.3.1.1 An H52-1B hydraulic ram was attached to one corner of the test panel in order to apply a load parallel to the long dimension of the panel.

3.3.1.2 The panel was mounted in the vacuum box by rigidly fastening the corner opposite the loading point to the vacuum box, using a welded up fixture of .37" Inconel X plates.

3.3.1.3 The loaded corner was restricted to motion in the direction of loading by attaching it to the box with a .050" Rene' 41 'Z' shaped fitting.

3.3.1.4 The general arrangement of the panel mounting is shown on Figure 84, Volume I.

3.3.1.5 The hydraulic ram setup and the vacuum box were rigidly mounted to the tie down rails in the floor of the test area.

3.3.1.6 The heat lamp setup and arrangement was identical to that of LT-5593-2-1.

3.3.1.7 A photograph of the setup is shown on Figure 25, Volume I.

3.3.2 Test Setup for LT-5593-3-2 (Panel 25-20352-2)

3.3.2.1 The entire test setup was identical to that for LT-5593-3-1.

3.3.3 Test Setup for LT-5593-3-3 (Panel 25-20370-1)

3.3.3.1 The entire test setup was identical to that for LT-5593-3-1.

3.4 Test Setup for LT-5593-4

3.4.1 Test Setup for LT-5593-4-1 (Panel 25-20374-1)

3.4.1.1 The test setup was identical to that of LT-5593-2-1, except that a model 600 Jaeger compressor was used as a vacuum pump to apply uniform loading to the test panel surface by creating a pressure differential across the top and bottom panel surfaces.

3.4.2 Test Setup for LT-5593-4-2 (Panel 25-20374-4)

3.4.2.1 The test panel was mounted in the vacuum box as shown on Figure 85, Volume I.

3.4.2.2 Inconel 702 foil seals were spotwelded to the panel and to the vacuum box to provide a seal for the pressure tests, but were omitted in the unsymmetrical heat cycles.

3.4.2.3 A two-inch thick Fibre Frax blanket was placed below the panel in all tests to block the flow of heat to the bottom of the vacuum box.

3.4.2.4 The pressure loading setup was identical to that of LT-5593-4-1.

3.4.2.5 The heat lamp setup and arrangement was identical to that of LT-5593-2-1.

3.4.3 Test Setup for LT-5593-4-3 (Panel 25-20352-1)

3.4.3.1 The test setup was identical to that for LT-5593-4-2.

3.4.4 Test Setup for LT-5593-4-4 (Panel 25-20370-2)

3.4.4.1 The test setup was identical to that for LT-5593-4-2.

3.4.5 Test Setup for LT-5593-4-5 (Panel 25-20352-2)

3.4.5.1 The test setup was identical to that for LT-5593-4-2 except no heat lamps or fibrefrax insulation was used since the test was to be run at room temperature.

3.4.6 Test Setup for LT-5593-4-6 (Panel 25-20370-1)

3.4.6.1 The test setup was identical to that for LT-5593-4-5.

3.5 Test Setup for LT-5593-5

3.5.1 Panel 25-20344-1, sonic test panel No. 1477, was mounted through the end clips to a pair of .040 gage Rene' 41 channels with 3/16" dia. bolts. The Rene' 41 channels in turn were attached at each end by 1/2" dia. bolts to a steel "picture frame" jig. The 23.5" edge of the specimen was unsupported. An anechoic box was attached to the underside of the "picture frame" jig to attenuate the sound level at the inside surface of the specimen. The panel mounting fixture was built so that the angle of sound with respect to the panel could be continuously varied at any angle from 0 to 90°. The exponential steel horn was rolled up to the panel mounting fixture with the axis of the horn bisecting the 23.5" panel edge.

3.5.2 Two Altec-Lansing Model 6786 electropneumatic transducers mounted on the exponential horn served as the noise source. The electrical signal to the transducers was provided by an Allison 3MAN9 noise generator and octave band equalizer through a dual channel McIntosh amplifier.

3.5.3 The microphones were monitored with a Ballantine true rms meter and a General Radio octave band analyzer. The outputs of the displacement pickups were also measured with the Ballantine meter. The output of both the microphones and the displacement pickups was tape recorded on a 4 sec. continuous loop tape for each condition.

4.0 TEST PROCEDURE

4.1 Test procedure for LT-5593-1 (Panels 25-20344-1, No's. 1477, 1478, 1479)

4.1.1 Each of three panels was sonic tested for five minutes at an overall sound level of 152 db. The output of the microphones was analyzed on a General Radio octave band analyzer and also recorded on magnetic tape. The microphone output octave band analysis was compared to the theoretical design spectrum. The output of the non-contact amplitude pickups were also recorded on magnetic tape.

4.1.2 After completing five minutes of sonic testing, the panels were inspected for failures and then sent to the Structures Laboratories Heat Lab. for a 15 minute 2000°F heat cycle test. (Ref. Figure 143).

4.1.3 The panels were returned to the Sonic Laboratory, inspected for failures and photographed. Each panel was reinstalled in the progressive wave chamber and sonic tested to the same spectrum for an additional 55 minutes. Microphone output was analyzed on the General Radio octave band analyzer and tape recordings made of the microphones and deflection pickups at the beginning and end of the 55 minute period. Each panel was removed from the progressive wave chamber and visually inspected for additional failures at 15 to 20 minute intervals and at the end of the test.

4.2 Test procedure for LT-5593-1 (Panels 25-20369-1, No's. 1493, 1494, 1495 and 25-20369-2, No's. 1497, 1498, 1499)

4.2.1 Each of six panels was sonic tested for five minutes at an overall sound level of 152.5 db. The output of the microphones was analyzed on an octave band analyser and compared to the theoretical design spectrum. The output of the microphones was also recorded on magnetic tape. Spectral density analyses were made from these tapes.

4.2.2 After completing five minutes of sonic testing, the panels were inspected for failures and sent to the Structures Laboratories Heat Lab. for the heat environment cycle defined in Paragraph 4.1.2.

4.2.3 The panels were then returned to the Sonic Laboratory, inspected for failures, and photographed. Each panel was reinstalled in the progressive wave chamber and sonic tested to the same spectrum for an additional 55 minutes. Microphone output was analyzed on the octave band analyzer and tape recordings made of the microphones and deflection pickups at the beginning and end of the 55 minute period. The test plan was changed during this phase of the program to include a 30 second test at an increased sound level of 157.5 db and another 30 second test at an increased level of 162.5 db. Data were recorded during each new level. Panels 1497, 1498, and 1499 were subjected to the revised sonic levels. Each panel was removed from the progressive wave chamber and visually inspected for failures at 15 to 20 minute intervals and at the end of the test.

4.3 Test procedure for LT-5593-2

4.3.1 Test procedure for LT-5593-2-1 (Panel 25-20374-1)

4.3.1.1 The simulated and test panels were subjected to a heating program consisting of ten cycles of symmetrical heat application to a maximum of 1750°F, plus an unsymmetrical heating cycle, also to 1750°F, as shown on Figure 89, Volume I. A linear temperature gradient was maintained from one long edge to the other.

4.3.1.2 Vertical and horizontal deflections were recorded during the heat cycling.

4.3.1.3 The digital data system was employed to record and reduce the data.

4.3.2 Test procedure for LT-5593-2-2 (Panel 25-20374-2)

4.3.2.1 The test panel was subjected to a heating program consisting of ten cycles of symmetrical heat application to 1870°F maximum plus an unsymmetrical heating cycle, also to 1870°F, as shown on Figure 90, Volume I. A linear temperature gradient was maintained from one long edge to the other.

4.3.2.2 The eleven monitor thermocouples were recorded at 24-second intervals utilizing a Leeds and Northrup strip chart recorder and a Boeing-designed stepping switch. The outputs from the five electronic deflection indicators were recorded during the first and last 25 minutes of testing on Electro Instruments' X-Y plotters.

4.3.3 Test procedure for LT-5593-2-3 (Panel 25-20352-1)

4.3.3.1 The 25-20374 panel, mounted in the outer, or upper, position on the vacuum box, was heated from above and re-radiated its heat to the test panel in the inner, or lower, position in the box.

4.3.3.2 The test panel heat program is shown on Figure 91, Volume I.

4.3.3.3 Thermocouple 4A, on the crest of an inner panel corrugation (see Figure 72, Volume I), was used to follow temperature on a manually controlled preliminary survey. Control thermocouple data from this survey was used to establish the program curves for the actual test.

4.3.3.4 Vertical panel deflections were recorded during the test.

4.3.4 Test procedure for LT-5593-2-4 (Panel 25-20352-2)

4.3.4.1 Test LT-5593-2-4 was run in a manner identical to that of test LT-5593-2-3.

4.3.5 Test procedure for LT-5593-2-5 (Panel 25-20370-1)

4.3.5.1 Test LT-5593-2-5 was run in a manner identical to that of test LT-5593-2-3.

4.3.6 Test procedure for LT-5593-2-6 (Panel 25-20370-2)

4.3.6.1 Test LT-5593-2-6 was run in a manner identical to that of LT-5593-2-3.

4.3.7 Test procedure for LT-5593-2-6B (Panel 25-20370-2)

4.3.7.1 Panel 25-20370-2 was subjected to an unsymmetrical heat condition consisting of a 250°F thermal gradient from one long edge of the panel to the other. Maximum temperature was 1200°F. See Figure 92, Volume I.

4.3.7.2 The panel was heated at a rate of 15°F/sec along one edge and at 13°F/sec along the opposite edge.

4.3.7.3 Vertical deflections were measured during the heat condition.

4.3.7.4 Two heat cycles were run.

4.4 Test procedure for LT-5593-3

4.4.1 Test procedure for LT-5593-3-1 (Panel 25-20374-1)

4.4.1.1 The test panel was heated symmetrically to 1870°F at a rate of 5°F/sec.

4.4.1.2 After the panel had reached test temperature, a shear load was applied at a rate of 100 lb/min. until failure of the panel occurred.

4.4.1.3 Electronic deflection indicator readings were recorded during the test.

4.4.2 Test procedure for LT-5593-3-2 (Panel 25-20352-2)

4.4.2.1 Test procedure for LT-5593-3-2 was identical to that of LT-5593-3-1 except the panel was not loaded to failure.

4.4.2.1.1 Loading was discontinued when deflection of the panel at the loading point had reached approximately .40".

4.4.3 Test procedure for LT-5593-3-3 (Panel 25-20370-1)

4.4.3.1 Test procedure for LT-5593-3-3 was identical tothat of LT-5593-3-2.

4.5 Test procedure for LT-5593-4

4.5.1 Test procedure for LT-5593-4-1 (Panel 25-20374-1)

4.5.1.1 The heating rate was to have been 3 degrees/second until the test temperature of 1750°F was reached. The panel temperatures were then to have been allowed to stabilize after which a load rate of 1 PSI/minute was to have been applied to the panel until failure occurred.

(See paragraph 6.4.1 for actual test conduct.)

4.5.1.2 To prevent the seals from buckling and overheating as they neared the lamps, a uniform load of approximately 0.50 PSI was applied to the test panel before and during the heating period.

4.5.1.3 An Electro Instruments X-Y plotter was used to continuously record the pressure differential. The pressure transducer was located near the bottom center of the vacuum box (reference Figure 71, Volume I). Eleven monitor thermocouples were recorded at 24 second intervals utilizing a Leeds & Northrup strip chart recorder and a Boeing designed stepping switch. Five electrical deflection indicators were also recorded continuously on Electro Instruments X-Y plotters.

4.5.2 Test procedure for LT-5593-4-2 (Panel 25-20374-2)

4.5.2.1 The test panel was symmetrically heated to 1870°F at a rate of 5°F/sec.

4.5.2.2 A pressure of .50 PSI was applied before and during heating period to avoid buckling and overheating the seals during heating.

4.5.2.3 After heating stabilization, test pressure was applied at the rate of 1.0 PSI/min. until failure.

4.5.2.4 Load was measured by a pressure transducer and automatically recorded on an X-Y plotter.

4.5.2.5 Vertical deflections were measured during the test.

4.5.3 Test procedure for LT-5593-4-3 (Panel 25-20352-1)

4.5.3.1 The test panel was given an unsymmetrical heat cycle by heating to 2000°F along one long edge at a rate of 15°F/sec, and heating to 1750°F along the opposite edge at a rate of 13°F/sec.

4.5.3.2 Deflection readings were taken during the heating cycle.

4.5.3.3 The test panel was then cooled to room temperature.

4.5.3.4 The test panel was then given a symmetrical heat cycle to 1870°F at a rate of 5°F/sec.

4.5.3.5 After the panel had reached test temperature, test pressure was applied at a rate of 1.0 PSI/min. until panel failure.

4.5.3.6 Deflection readings were taken during loading.

4.5.3.7 Load was measured by a pressure transducer and automatically recorded on an X-Y plotter.

4.5.4 Test procedure for LT-5593-4-4 (Panel 25-20370-2)

4.5.4.1 The test procedure for LT-5593-4-4 was identical to that of LT-5593-4-3.

4.5.5 Test procedure for LT-5593-4-5 (Panel 25-20352-2)

4.5.5.1 Test pressure was applied at a rate of 1.0 PSI/min. until panel failure.

4.5.5.2 Load was measured by a pressure transducer and automatically recorded on an X-Y plotter.

4.5.5.3 Vertical deflections were measured during the test.

4.5.6 Test procedure for LT-5593-4-6 (Panel 25-20370-1)

4.5.6.1 The test procedure for LT-5593-4-6 was identical to that of LT-5593-4-5.

4.6 Test procedure for LT-5593-5 (Panel 25-20344-1, No. 1477)

4.6.1 The panel response was measured at two overall sound levels, 140 db and 147 db. The spectrum was shaped to the design octave band spectrum using the Allison equalizer with the panel at 0° sound incidence. Tape recordings of the microphone and pickup output were made at each specified angle of sound incidence. A power spectral density analysis was run on each recording and a peak count analysis was made of five selected recordings.

4.7 Panel Testing Summary

Panel Drawing Number	Panel Number	Testing Sequence
25-20344-1	1477	LT-5593-5, -1
	1478	LT-5593-1
	1479	LT-5593-1
25-20369-1	1493	LT-5593-1 ⚠1
	1494	LT-5593-1
	1495	LT-5593-1 ⚠1
25-20369-2	1497	LT-5593-1
	1498	LT-5593-1
	1499	LT-5593-1
25-20352-1	One Panel Tested	LT-5593-2-3, -4-3
25-20352-2	One Panel Tested	LT-5593-2-4, -3-2, -4-5
25-20370-1	One Panel Tested	LT-5593-2-5, -3-3, -4-6
25-20370-2	One Panel Tested	LT-5593-2-6, -2-6B, -4-4
25-20374-1	One Panel Tested	LT-5593-2-1, 4-1, 3-1
25-20374-2	One Panel Tested	LT-5593-2-2, -4-2

⚠1 Panel was subsequently subjected to vibration and acceleration tests as detailed in D2-80080, "Insulated Panel Development Dyna-Soar".

5.0 TEST RESULTS

5.1 Test results, LT-5593-1

5.1.1 Panels 25-20344, No's. 1477, 1478, 1479

5.1.1.1 The individual panel test logs with inspection records are shown on Figures 93 through 95, Volume I.

5.1.1.2 45 power spectral density analyses were made from the magnetic tape records. See Figures 96 through 140, Volume I.

5.1.1.3 Time-temperature graphs of the heat cycle on each panel are plotted on Figures 141 through 143, Volume I.

5.1.1.4 Microphone output compared to design spectrum is shown on Figures 144 through 146, Volume I.

5.1.2 Panels 25-20369-1, No's. 1493, 1494, 1495 and 25-20369-2, No's 1497, 1498, 1499

5.1.2.1 The individual panel test logs with inspection records are shown on Figures 147 through 152, Volume I.

5.1.2.2 TPC power spectral density analyses of sound and panel amplitude plots and peak counts were made from the tape recordings. See Figures 153 through 222, Volume I.

5.1.2.3 Microphone output compared to design spectrum is shown on Figures 223 through 228, Volume I.

5.2 Test results, LT-5593-2

5.2.1 Test results, LT-5593-2-1 (Panel 25-20374-1)

5.2.1.1 Seven vertical deflections were recorded to determine the vertical deflections of the 25-20374 panel center and the centers of the long edges with respect to the panel corners. The maximum vertical deflection occurred during the early cycles at the panel center and was approximately 0.40 inches. See Figures 1 through 46, Volume II.

5.2.1.2 Horizontal deflections of the long edge (heated to 1500°F maximum) mid point and ends were measured. No significant deviation among the three measurements was observed. Maximum horizontal deflections reached 0.11 inches during the first ten cycles and 0.09 inch during the unsymmetrical heating cycle. See Figures 7 and 8, Volume II.

5.2.1.3 Temperature data is included on Figures 9 through 40, Volume II.

5.2.2 Test results, LT-5593-2-2 (Panel 25-20374-2)

5.2.2.1 Thermocouple data is included on Figures 41 through 66, Volume II.

5.2.2.2 Deflection curves are included on Figures 67 through 71, Volume II.

5.2.3 Test results, LT-5593-2-3 (Panel 25-20352-1)

5.2.3.1 Deflection of the inner, or test, panel was measured at three points.

5.2.3.1.1 Deflections at two corners were measured to provide references for panel center deflections. Maximum deflection occurred at the panel center (EDI D04) and was 0.24".

5.2.3.1.2 Deflection vs. time records are included on Figures 72 through 76, Volume II.

5.2.3.2 Temperature vs. time records are included on Figures 77 through 104, Volume II.

5.2.4 Test results, LT-5593-2-4 (Panel 25-20352-2)

5.2.4.1 Deflection of the inner, or test, panel was measured at three points.

5.2.4.1.1 Deflections at two corners were measured to provide references for panel center deflections. Maximum deflection occurred at the panel center (EDI D04) and was 0.21".

5.2.4.1.2 Deflection vs. time records are included on Figures 105 through 109, Volume II.

5.2.4.2 Temperature vs. time records are included on Figures 110 through 137, Volume II.

5.2.5 Test results, LT-5593-2-5 (Panel 25-20370-1)

5.2.5.1 Deflection of the inner, or test, panel was measured at three points.

5.2.5.1.1 Deflections at two corners were measured to provide references for panel center deflections. Maximum deflection occurred at the panel center (EDI D04) and was 0.38".

5.2.5.1.2 Deflection vs. time records are included on Figures 138 through 142, Volume II.

5.2.5.2 Temperature vs. time records are included on Figures 143 through 168, Volume II.

5.2.6 Test results, LT-5593-2-6 (Panel 25-20370-2)

5.2.6.1 Deflections of the inner, or test, panel were measured at three points.

5.2.6.1.1 Deflections at two corners were measured to provide references for panel center deflections. Maximum deflection occurred at the panel center (EDI D04) and was 0.45".

5.2.6.1.2 Deflection vs. time records are included on Figures 169 through 173, Volume II.

5.2.6.2 Temperature vs. time records are included on Figures 174 through 197, Volume II.

5.2.7 Test results, LT-5593-2-6B (Panel 25-20370-2)

5.2.7.1 A record of peak test temperatures is given on Figure 75, Volume I, for both cycles.

5.2.7.2 Maximum deflection of the panel occurred at the center of the panel 3.75 minutes after the start of each cycle and was .465" in cycle one, and .490" in cycle two.

5.2.7.3 Deflections at all EDI locations at 3.75 minutes are given for both cycles on Figure 76, Volume I.

5.2.7.4 Deflection vs. time records are included on Figures 198 through 202, Volume II.

5.3 Test results, LT-5593-3

5.3.1 Test results, LT-5593-3-1

5.3.1.1 No data was taken on this test.

5.3.2 Test results, LT-5593-3-2 (Panel 25-20352-2)

5.3.2.1 Deflection vs. load curves are included on Figures 203 through 210, Volume II.

5.3.3 Test results, LT-5593-3-3 (Panel 25-20370-1)

5.3.3.1 Deflection vs. load curves are included on Figures 211 through 218, Volume II.

5.4 Test results, LT-5593-4

5.4.1 Test results, LT-5593-4-1 (Panel 25-20374-1)

5.4.1.1 The pressure applied to the panel remained nearly constant during the tests (reference Figure 219, Volume II). Deflection curves are shown on Figures 220 through 224, Volume II. The maximum recorded deflection was 1.02 inches measured near the panel center. Monitor thermocouple temperatures during power and panel failures are represented on Figure 225, Volume II.

5.4.1.2 Time vs. temperature curves are included on Figures 226 through 233, Volume II.

5.4.2 Test results, LT-5593-4-2 (Panel 25-20374-2)

5.4.2.1 The test panel failed at a load of 1.1 PSI.

5.4.2.2 Panel center deflection immediately preceding failure was .38" measured from the panel position at temperature without load.

5.4.2.3 Deflection vs. pressure data are included on Figures 234 through 238, Volume II.

5.4.3 Test results, LT-5593-4-3 (Panel 25-20352-1)

5.4.3.1 Maximum deflection during the unsymmetrical heat cycle was .33" at the center of the panel at maximum temperature.

5.4.3.2 During the pressure phase, the panel failed at a load of 2.05 PSI.

5.4.3.3 The deflection of the panel center, immediately prior to failure, was .78" measured from panel position at temperature without load.

5.4.3.4 Deflection vs. pressure data are included on Figures 239 through 243, Volume II.

5.4.4 Test results, LT-5593-4-4 (Panel 25-20370-1)

5.4.4.1 The maximum deflection during the unsymmetrical heating cycle at the panel center was approximately .8".

5.4.4.2 The pressure test caused panel failure by buckling at 2.05 PSI.

5.4.4.3 Maximum center deflection, at instant of failure, was approximately 1.0".

5.4.4.4 Deflection vs. pressure data are included on Figures 244 through 248, Volume II.

5.4.5 Test results, LT 5593-4-5 (Panel 25-20352-2)

5.4.5.1 Deflection vs. pressure curves are included on Figures 249 through 253, Volume II.

5.4.6 Test results, LT-5593-4-6 (Panel 25-20370-1)

5.4.6.1 Deflection vs. pressure curves are included on Figures 254 through 258, Volume II.

5.5 Test results, LT-5593-5 (Panel 25-20344-1, No. 1477)

5.5.1 The effect of sound angle of incidence on panel amplitude at 140 db and 147 db is shown on Figure 259, Volume II. In addition, 49 power spectral density analyses were made. See Figures 260 through 308, Volume II.

5.5.2 Microphone output compared to design spectrum is shown on Figures 309 and 310, Volume II.

5.6 The following is a tabulation of types of tests run and panels tested.

LT-5593-1	Sonic Tests	Panel 25-20344
	Sonic Tests	Panel 25-20369-1, -2 [1]
LT-5593-2-1	Thermal Cycle Tests	Panel 25-20374-1
LT-5593-2-2	Thermal Cycle Tests	Panel 25-20374-2
LT-5593-2-3	Thermal Cycle Tests	Panel 25-20352-1
LT-5593-2-4	Thermal Cycle Tests	Panel 25-20352-2
LT-5593-2-5	Thermal Cycle Tests	Panel 25-20370-1
LT-5593-2-6	Thermal Cycle Tests	Panel 25-20370-2
LT-5593-2-6B	Thermal Cycle Tests	Panel 25-20370-2
LT-5593-3-1	Shear Tests	Panel 25-20374-1
LT-5593-3-2	Shear Tests	Panel 25-20352-2
LT-5593-3-3	Shear Tests	Panel 25-20370-1
LT-5593-4-1	Pressure Tests	Panel 25-20374-1
LT-5593-4-2	Pressure Tests	Panel 25-20374-2
LT-5593-4-3	Pressure Tests	Panel 25-20352-1
LT-5593-4-4	Pressure Tests	Panel 25-20370-2
LT-5593-4-5	Pressure Tests	Panel 25-20352-2
LT-5593-4-6	Pressure Tests	Panel 25-20370-1
LT-5593-5	Sonic Tests	Panel 25-20344

[1] Two 25-20369-1 panels were subsequently subjected to vibration and acceleration tests as detailed in D2-80080, "Insulated Panel Development Dyna-Soar".

6.0 TEST OBSERVATIONS

6.1 Test observations, LT-5593-1

6.1.1 Panels 25-20344, No's. 1477, 1478, 1479

6.1.1.1 No failures were detected at the end of the first five minutes of sonic testing. At the end of the 15 minute heat test, the panel skins had assumed a general waffle-like appearance and numerous spotweld failures and skin cracks occurred along the supported edges of the specimen. At each inspection interval during the 55 minute sonic test, additional spotweld failures and skin cracks were detected.

6.1.1.2 Diagrams indicating spotweld failures and skin cracks due to heat and sonic testing are presented on Figures 86, 87 and 88, Volume I.

6.1.1.3 Photographs of the specimens after the 5 minute sonic test and 2000°F. heat test, but prior to the 55 minute sonic test, are shown on Figures 26, 27 and 28, Volume I, with the failures marked with an inking pen.

Photographs of the specimen after the 55 minute sonic test are on Figures 29, 30 and 31, Volume I.

6.1.1.4 The reasons that the heat cycles differed for each panel were as follows:

6.1.1.4.1 Panel 1477 - During the increase from 1300°F. to 2000°F., a bad Thyratron in Phase II of the power unit for Zone 2 caused Zone 2 to have a slower heat rate than Zone 1.

6.1.1.4.2 Panel 1478 - After the temperature had been at 2000°F. for 25 seconds, a malfunction of equipment cutoff power to the heat lamps. The temperature decreased to ambient and Dyna-Soar personnel inspected the panel. The panel was then heated to 2000°F. and held there for 15 minutes.

6.1.1.4.3 Panel 1479 - All test conditions were completed according to the predetermined time-temperature program.

6.1.2 Panels 25-20369-1, No's. 1493, 1494, 1495 and 25-20369-2, No's. 1497, 1498, 1499

6.1.2.1 No failures were detected at the end of the first 5 minutes of sonic testing. Sonic testing of the panels after the heat test produced no detectable structural failures on visual inspection in the Sonic Lab. Small fragments of the Fiberfrax insulation crumbled and vibrated from between the skin structure and wire mesh backing along the exposed edges of panels.

6.1.2.2 Photographs of the specimens after the 5 minute sonic test and the 2000°F. heat test, but prior to the 55 minute sonic test, are shown on Figures 32 through 43, Volume I.

6.1.2.3 Panel 1494 was burned so badly during the heat test that further sonic testing was not completed on this panel.

6.2 Test observations, LT-5593-2

6.2.1 Test observations, LT-5593-2-1, Panel 25-20374-1

6.2.1.1 Thermocouples on the beaded seal indicated temperatures in excess of 2000°F during the first cycle and necessitated the disconnection of seven lamps in this area for the remainder of the test. The beaded seal temperatures were then observed to have a maximum gradient of approximately 700°F and did not exceed 1700°F. One corner of the 25-20374 panel was consistently 200°F below the rest of the panel at maximum temperature.

6.2.1.2 Thermocouples show that a non-linear lateral temperature distribution during the unsymmetrical heating cycle subjected the 25-20374 panel to more thermal stress than if the required linear distribution could have been produced.

6.2.1.3 Surface panel damage if any, could not be detected. Only broken spotwelds between the panel seal and the beaded seal were evident.

6.2.2 Test observations, LT-5593-2-2 (Panel 25-20374-2)

6.2.2.1 Thermocouple data indicate that maximum panel surface temperature deviations from the required temperatures occurred during the 11th or unsymmetrical heating cycle.

6.2.2.1.1 Thermocouple No. 7 reached a maximum of 1630°F during this cycle versus the 1870°F stipulated. Simularly, during the 11th cycle, thermocouples no. 4 required a 1685°F maximum and no. 40 required a 1500°F maximum. They reached maximums of 1720°F and 1545°F respectively. A panel surface temperature (thermocouple no. 7) of 1660°F maximum was indicated as the largest deviation from the required temperature of 1870°F from the symmetrical heating cycles reported.

6.2.2.2 The surface of the Fiberfrax batt nearest the test panel reached a maximum of 1455°F forty-nine minutes after the start of the test. The gradient through the two inch thick insulation at this time was 520°F.

6.2.2.3 Temperature readings for the lower crest of the corrugation at the panel center (reference corrugation at the panel center, Figure 41, Volume II, thermocouple no. 3) are not reported due to a faulty thermocouple.

6.2.2.4 Deflection curves indicate that a maximum vertical deflection of 0.37 inches occurred during the first heating cycle near the center of the panel. See Figure 70, Volume II.

6.2.2.5 Buckling of the seals caused spotweld failures and some damage to the panel seal. One-half inch diameter Inconel 702 foil disks, spotwelded to the panel seal in an attempt to repair holes or damage incurred during fabrication, loosened considerably.

6.2.3 Test observations, LT-5593-2-3 (Panel 25-20352-1)

6.2.3.1 Due to limitations of the X-Y plotters it was necessary to block out the time base on the deflection record during some of the cycles on each test. The deflection curve for each of these cycles is represented by a straight vertical line from which only maximum and minimum deflections can be read.

6.2.3.2 Examination of the deflection curves and the tested panel revealed that no damage resulted from the tests.

6.2.4 Test observations, LT-5593-2-4 (Panel 25-20352-2)

6.2.4.1 Examination of the deflection curves and the tested panel revealed that no damage resulted from the tests.

6.2.5 Test observations, LT-5593-2-5 (Panel 25-20370-1)

6.2.5.1 Due to limitations of the X-Y plotters, it was necessary to block out the time base on the deflection record during some of the cycles on each test. The deflection curve for each of these cycles is represented by a vertical line from which only maximum and minimum deflections can be read.

6.2.5.2 Deflection of one panel corner was indicated by the plotter as being approximately 0.25" on cycles 5 and 6. (See curve for EDI D01). Since this corner is limited in vertical motion by brackets attached to the vacuum box, (see plan view, Figure 82, Volume I), this data is questionable. Examination of the bracket installation after test showed no failure of this attachment that could have allowed this much deflection. Also an operational check of the recording equipment indicated normal performance.

6.2.6 Test observations, LT-5593-2-6 (Panel 25-20370-2)

6.2.6.1 Examination of the deflection curves and the tested panel revealed that no damage resulted from the tests.

6.2.7 Test observations, LT-5593-2-6B (Panel 25-20370-2)

6.2.7.1 A visual examination of the panel following the test did not reveal any damage.

6.3 Test observations, LT-5593-3

6.3.1 Test observations, LT-5593-3-1 (Panel 25-20374-1)

6.3.1.1 Panel deflections went beyond calibration range of the EDI's.

6.3.1.1.1 Calibrated range of the EDI's was .25". Panel deflections exceeded 1.0" under heat and load.

6.3.1.2 No valid data was taken and none is presented. Failure of the panel under load prevented a rerun of the test.

6.3.2 Test observations, LT-5593-3-2 (Panel 25-20352-2)

6.3.2.1 A visual examination of the panel following the test did not reveal any damage.

6.3.3 Test observations, LT-5593-3-3 (Panel 25-20370-1)

6.3.3.1 A visual examination of the panel following the test did not reveal any damage.

6.4 Test observations, LT-5593-4

6.4.1 Test observations, LT-5593-4-1 (Panel 25-20374-1)

6.4.1.1 The test was conducted as planned with a uniform load of 0.50 PSI and a heating rate of approximately three degrees/second being applied until a plant power failure occurred 577 seconds after the start of the test. This power failure caused heat to be lost from the eight control zones shown on Figures 225 through 233, Volume II. Following power return to the heating lamps, the panel was heated at a rate over one-hundred degrees/second as the computer attempted to return to the heating curve.

6.4.1.2 Between the time of power failure and return to the heating curve the corrugations of 1/2 the panel (zone 5) buckled at the upper crests at their beam centerline. Because power to the lamps of the different zones could not be restored to the panel concurrently, temperature gradients may have induced enough thermal stress to cause the failure in zone 5. The maximum gradient, approximately 1040°F, occurred between zone 1 and zone 5 at the test time of 602 seconds. Note that the control thermocouple temperature curve on Figure 229, Volume II, represents the temperature of the zone 4 region adjacent to zone 6 only.

Additional study of the data indicates the possibility of panel failure occurring in zone 5 prior to the failure time as indicated by a deflection indicator (reference Figure 223, Volume II) located near the center of the panel. Flagnote 1 on Figure 230, Volume II, points out that the control thermocouple for zone 5 indicates that the panel lost temperature as it was being reheated following the restoration of plant power.

6.4.1.2 (Continued)

One probable explanation is that the control thermocouple moved away from the heat lamps as the corrugations failed in the area of zone 5. The failure of the corrugations in zone 5, detected in this manner, would then have occurred approximately 29 seconds prior to the failure as indicated by the deflection near the center of the panel nine inches away.

6.4.2 Test observations, LT-5593-4-2 (Panel 25-20374-2)

6.4.2.1 The panel failure consisted of buckling of the corrugations and "caving in" of the panel.

6.4.2.2 Photographs of panel damage are on Figures 44 through 48, Volume I.

6.4.3 Test observations, LT-5593-4-3 (Panel 25-20352-1)

6.4.3.1 The unsymmetrical heat cycle produced no visible damage.

6.4.3.2 Panel damage due to pressure is shown in the photographs, Figures 49 through 52, Volume I.

6.4.4 Test observations, LT-5593-4-4 (Panel 25-20370-2)

6.4.4.1 The unsymmetrical heat cycle resulted in damage as shown on Figures 53 and 54, Volume I.

6.4.4.2 Panel damage is shown in the photographs on Figures 55, 56 and 57, Volume I.

6.4.5 Test observations, LT-5593-4-5 (Panel 25-20352-2)

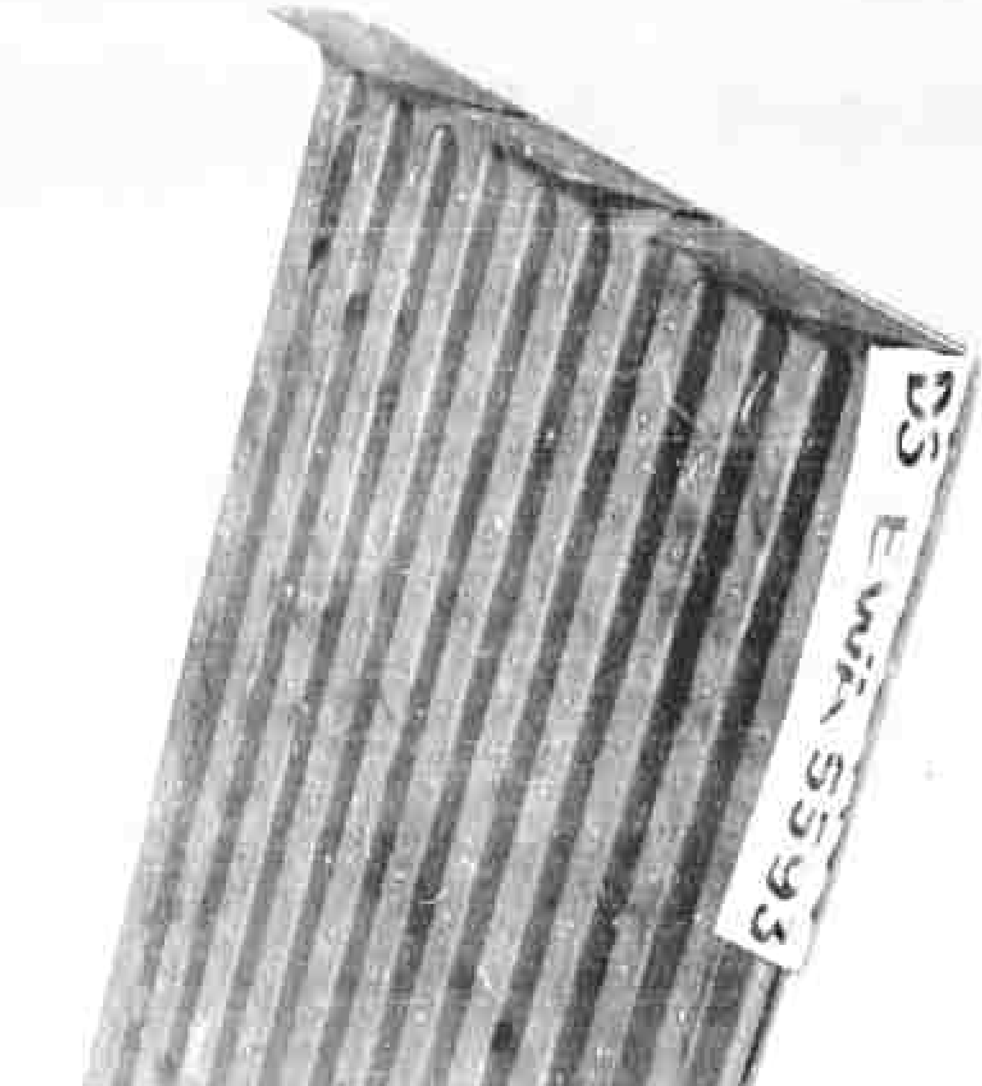
6.4.5.1 The test panel failed under pressure as shown on Figures 58, 59 and 60, Volume I.

6.4.6 Test observations, LT-5593-4-6 (Panel 25-20370-1)

6.4.6.1 The test panel failed under pressure as shown on Figures 61 through 64, Volume I.

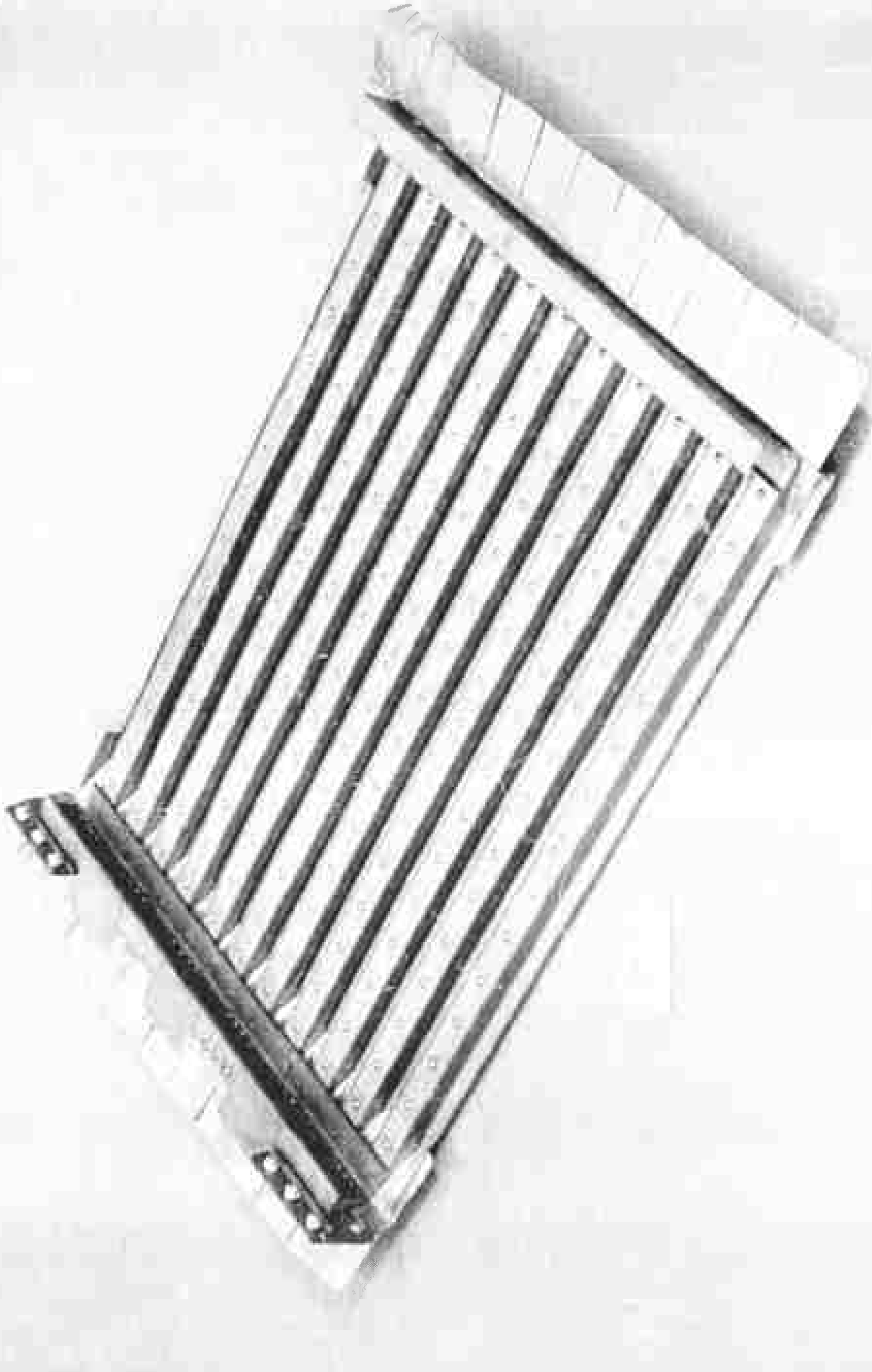
6.5 Test observations, LT-5593-5 (Panel 25-20344-1, No. 1477)

6.5.1 Figure 259, Volume II, shows the effect of sound angle of incidence on panel amplitude response. The Dyna-Soar sonic fatigue program has been setup to test specimens at 0° (grazing) incidence.



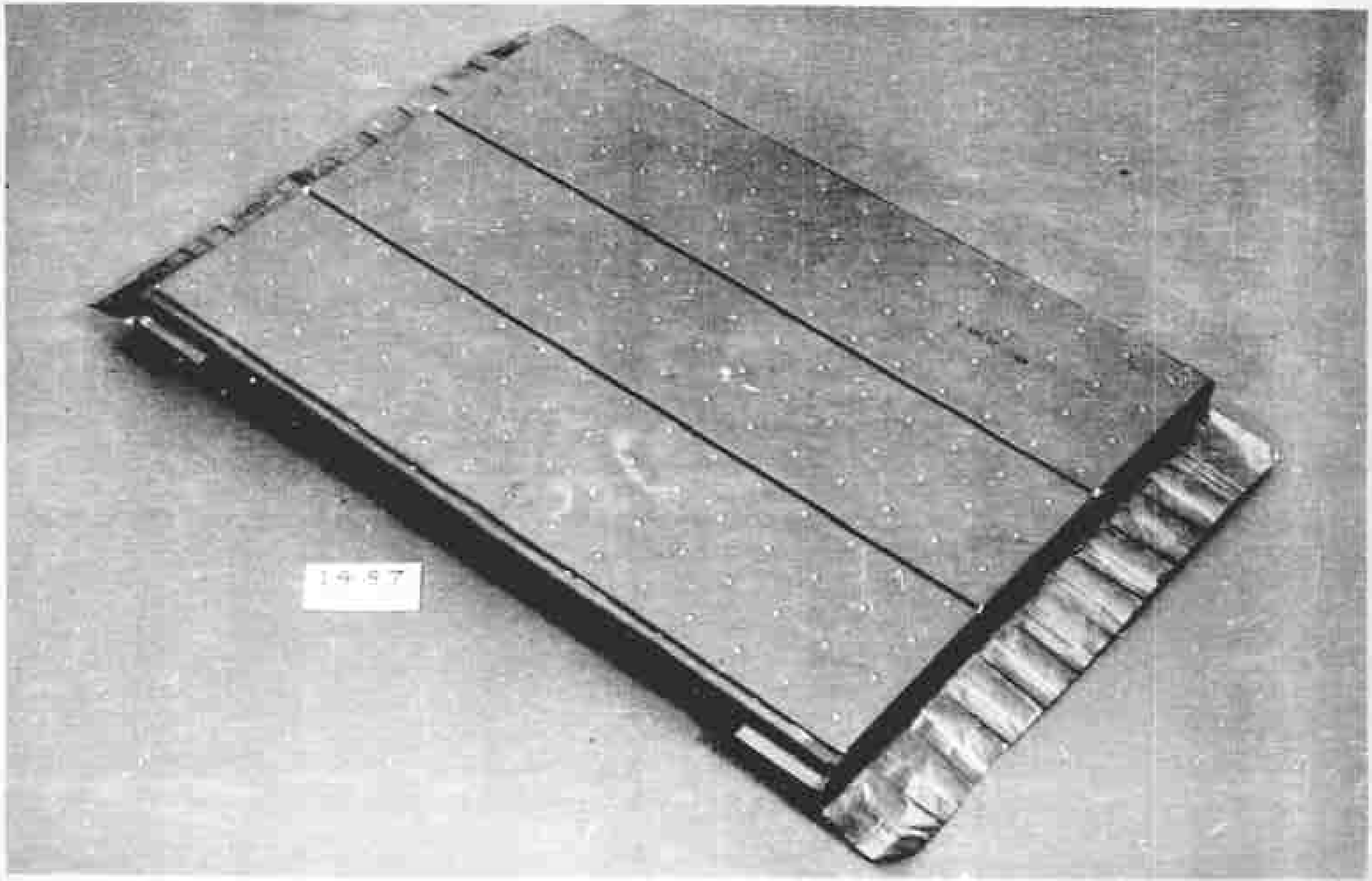
EWA 593 DS PANEL 1493 2A00721

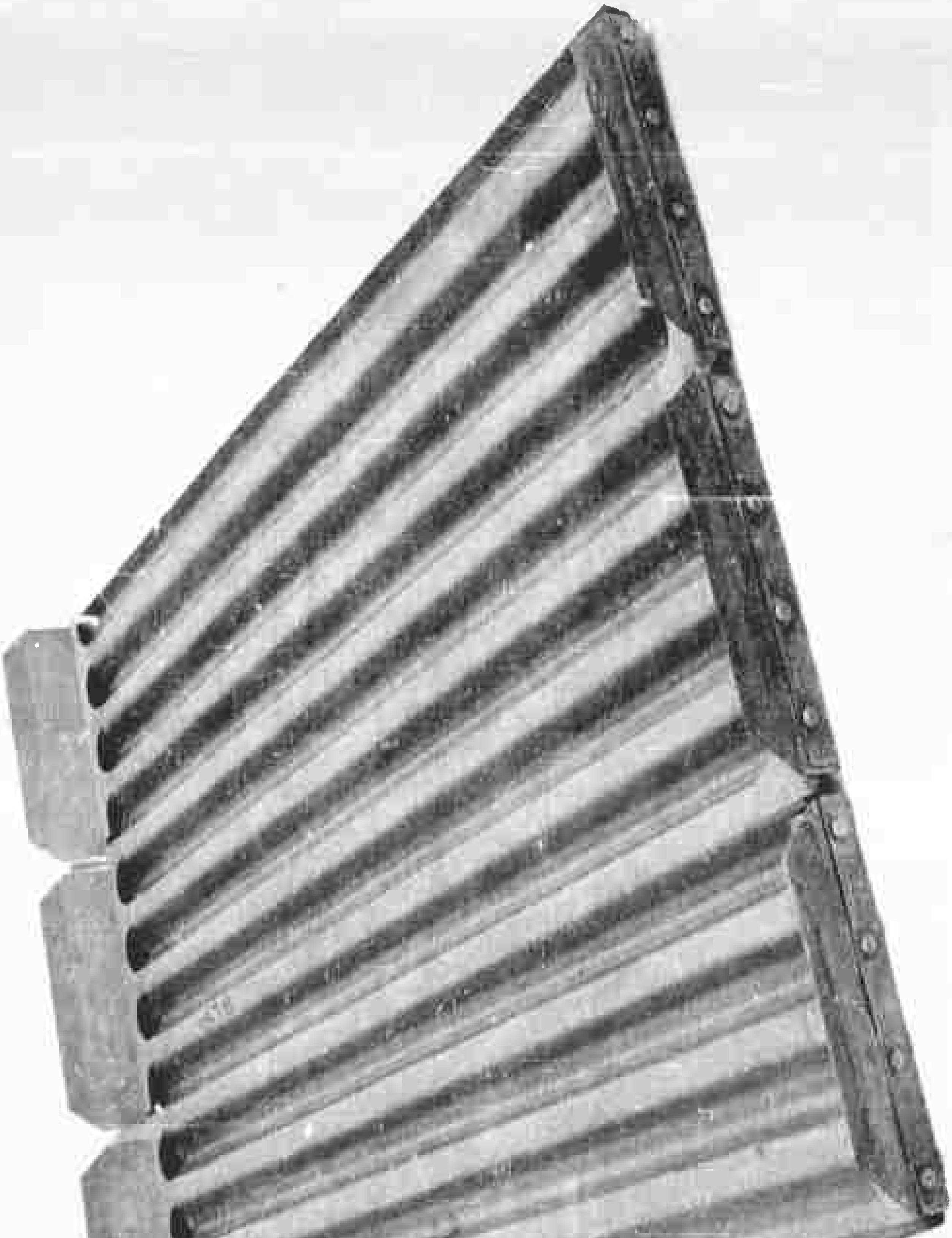

PANEL 1493



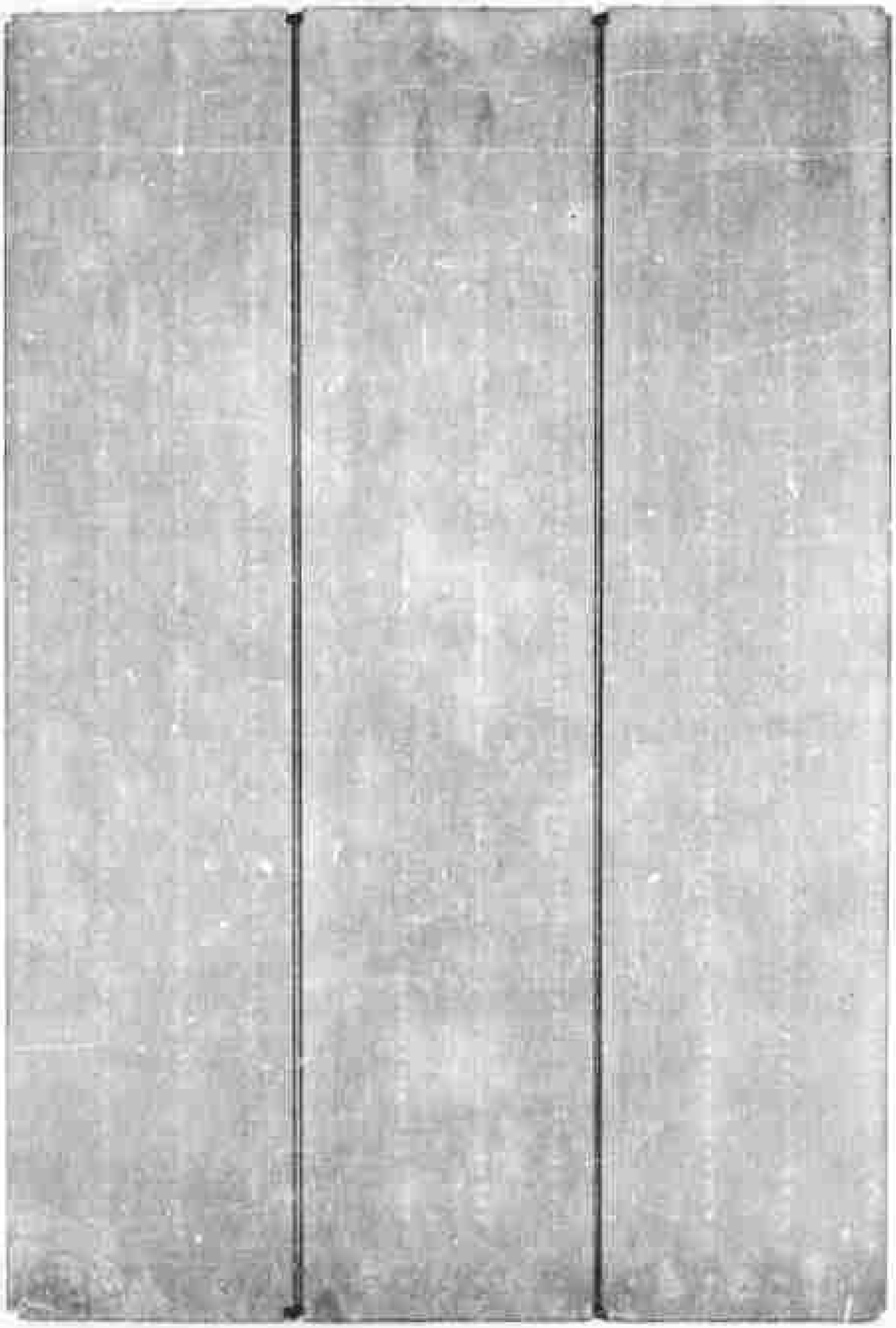
EWA - 5-593 PANEL ATTACHMENT - TYPE I PRELIM. 2A65948
SONIC TEST 5-1-61

EWA 5-593 PANEL ATTACHMENT - TYPE I PRELIM. 2A65944
SONIC TEST. 5-1-61

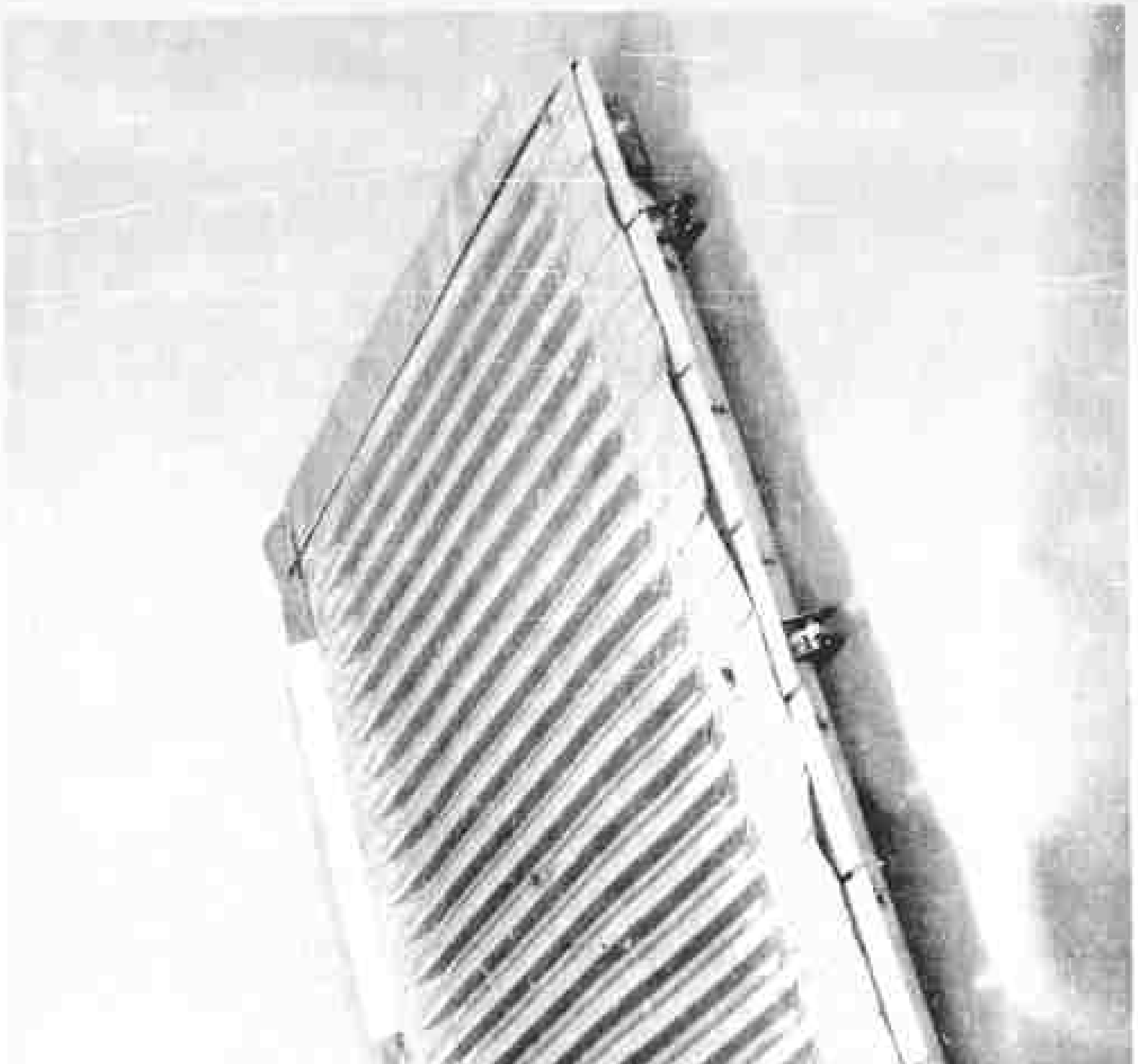




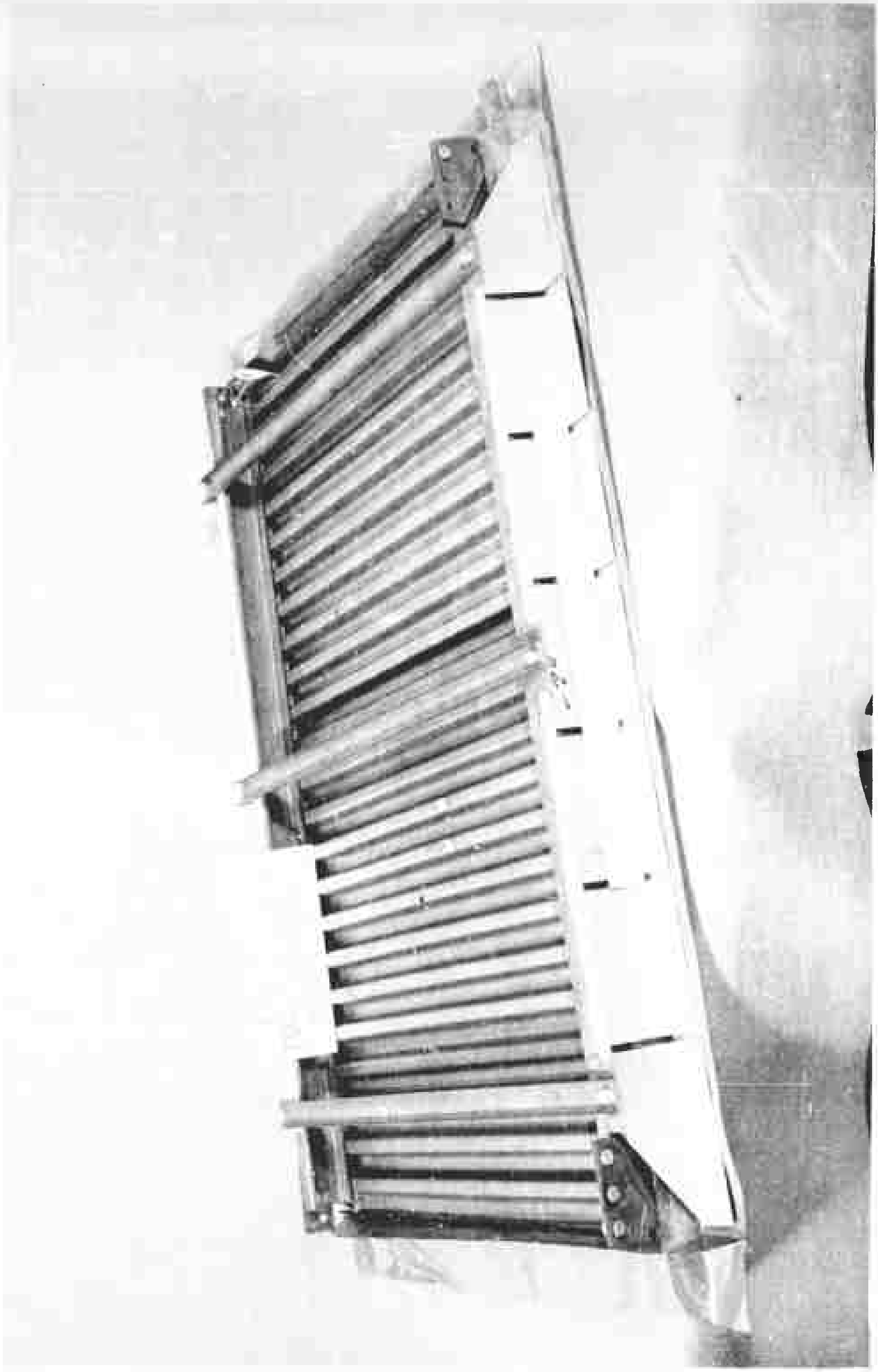
DYNASOAR NON-INSULATED PANEL TEST SPECIMEN 2A53544
AND SONIC TEST 12-7-60 (RENE 41)



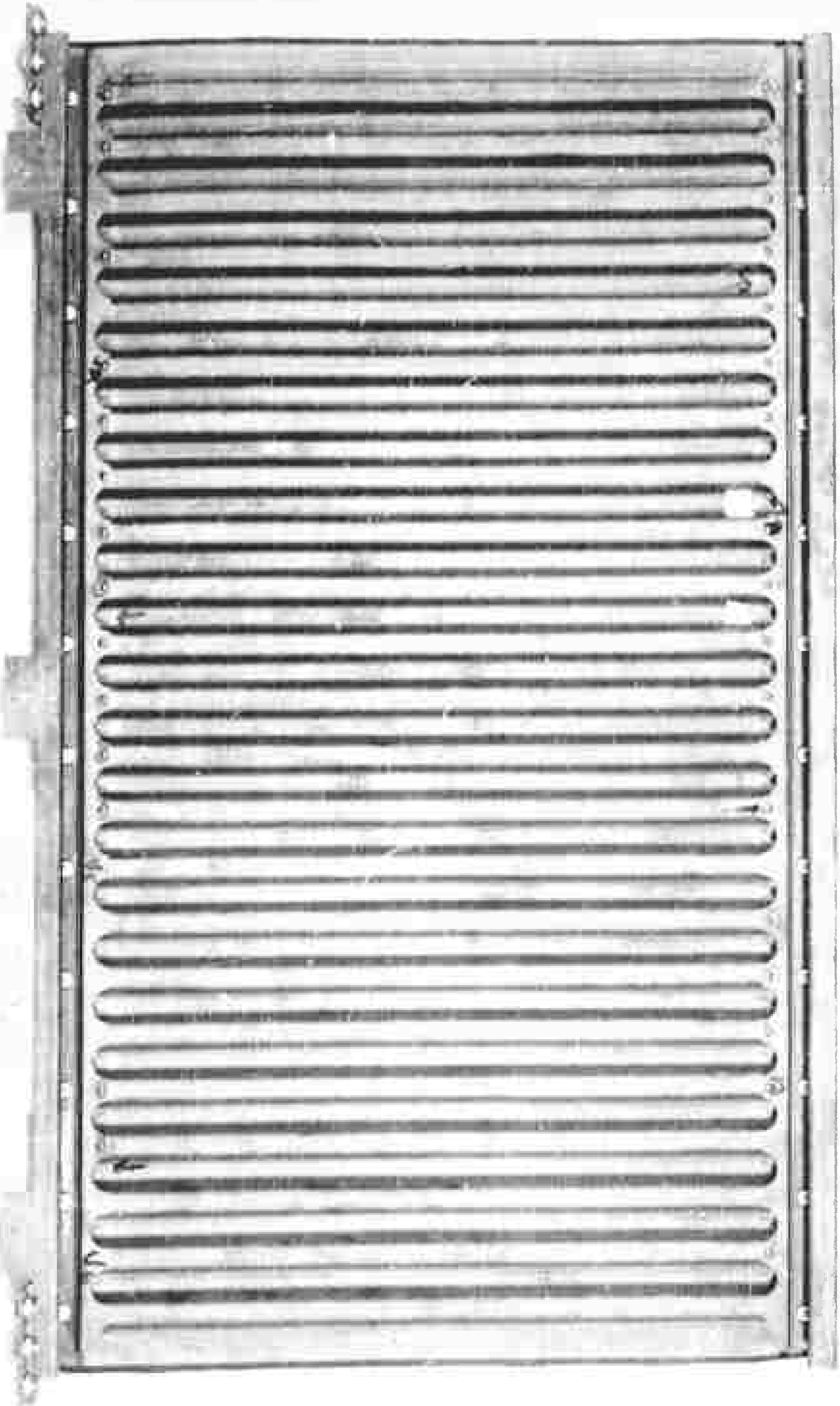
DYNASOAR NON-INSULATED PANEL TEST SPECIMEN 2A53542
AND SONIC TEST 12-7-60 (RENE 41)



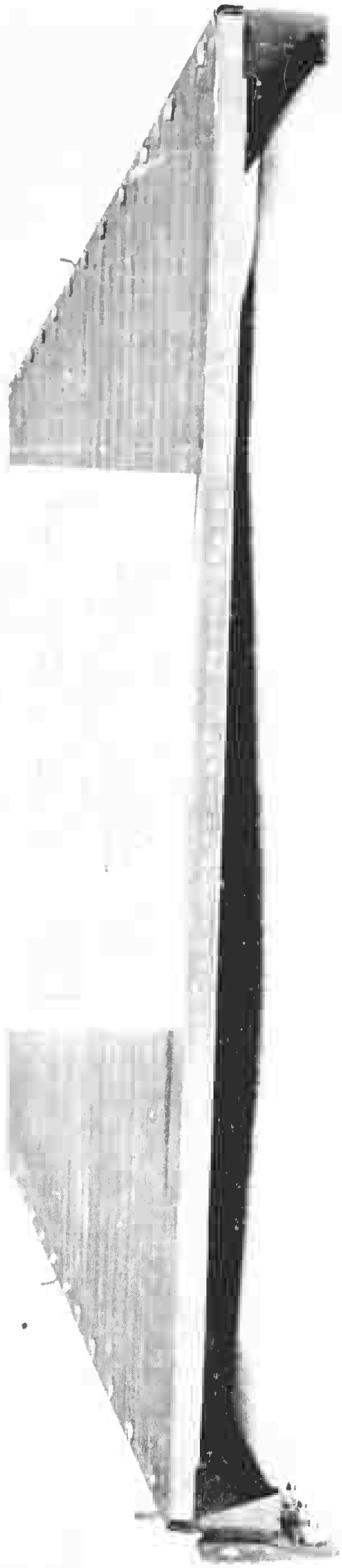
DS-I - RENE 41 WING PANELS FWA



DS-I - RENE 41 WING PANELS

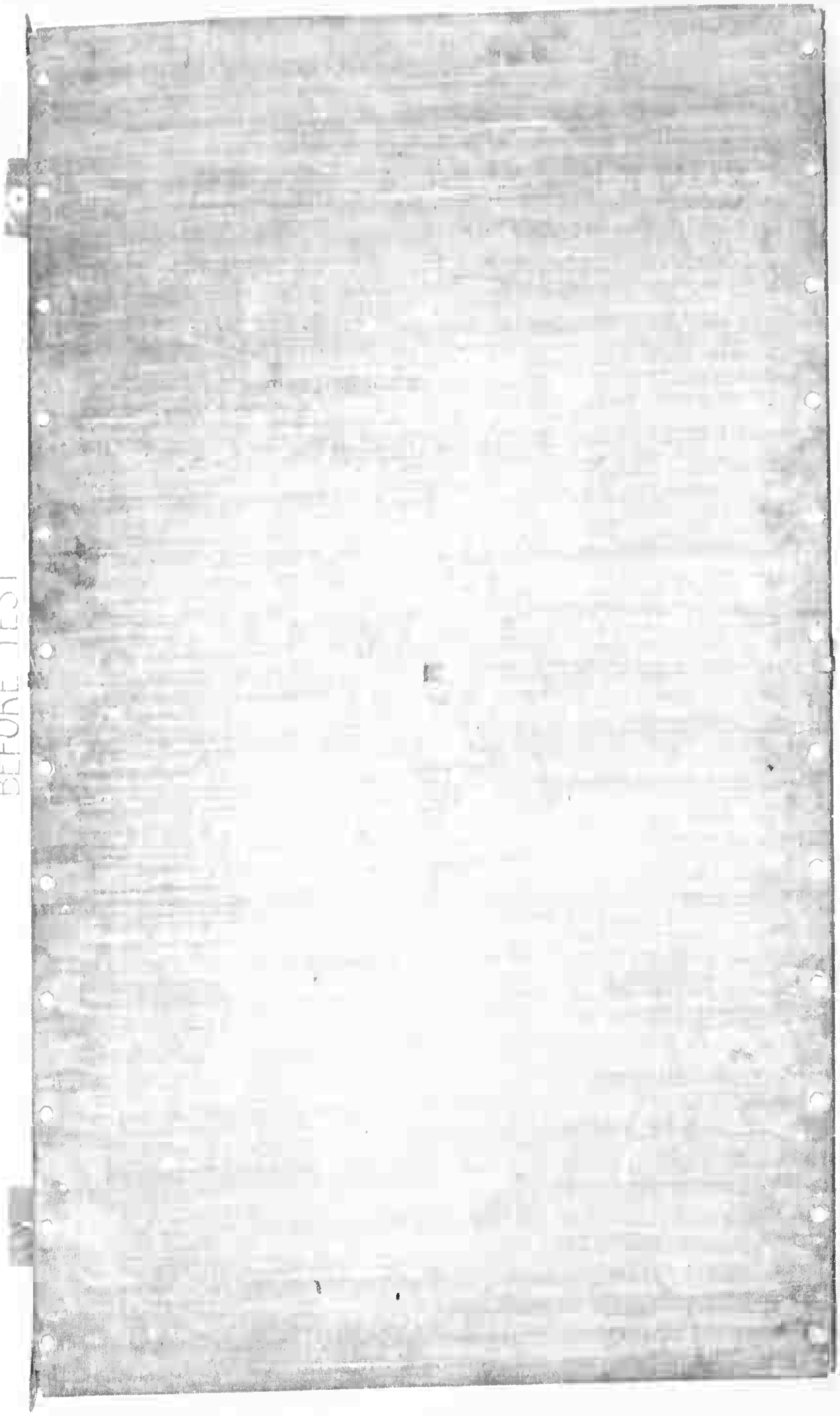


DS-I PANEL #25-20570 3-7-61 2A62517

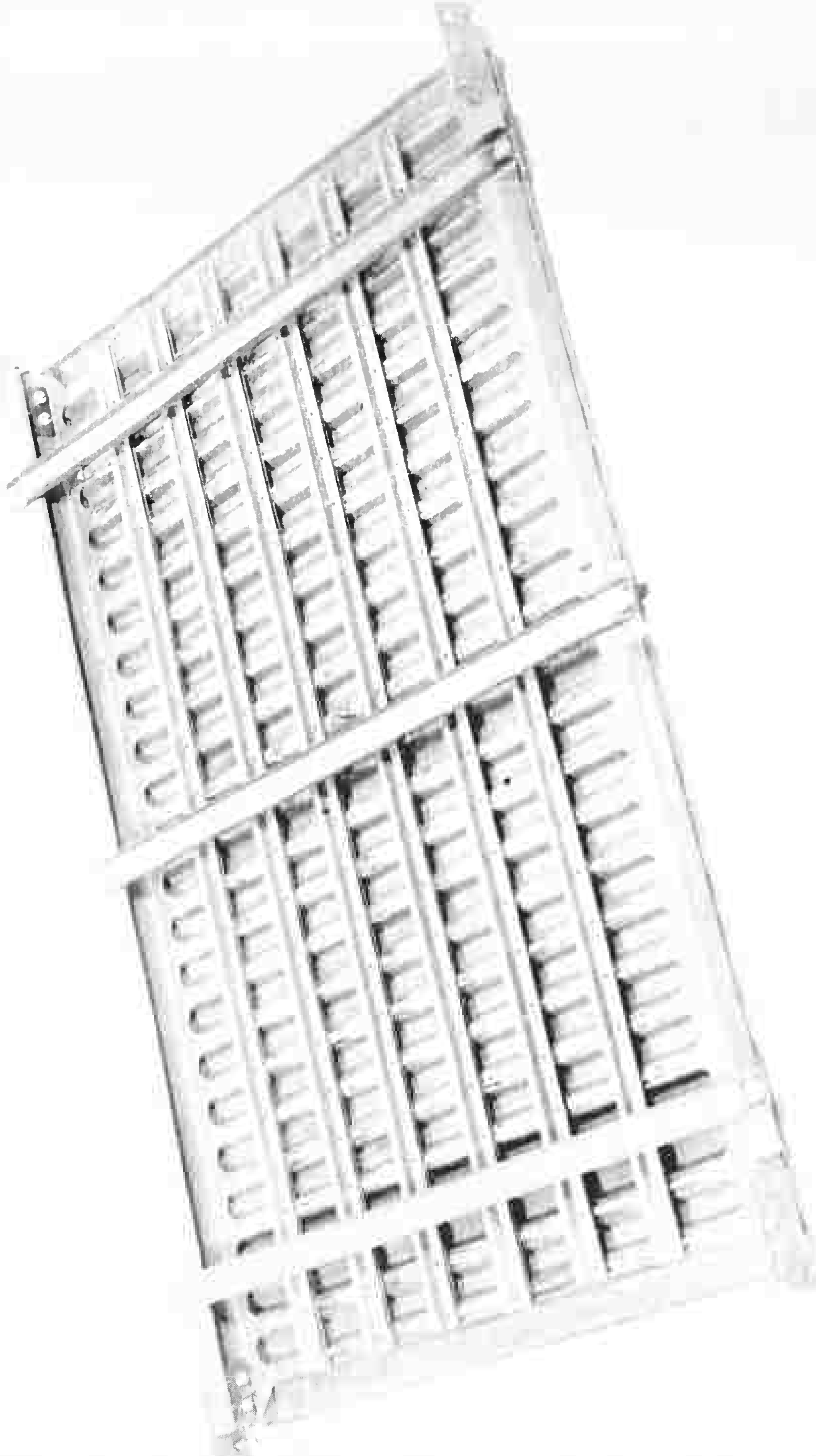


DS-I PANEL #25-20370 3-7-61 2A62516

EWA 5-593
DWG #25-20370 #1
BEFORE TEST

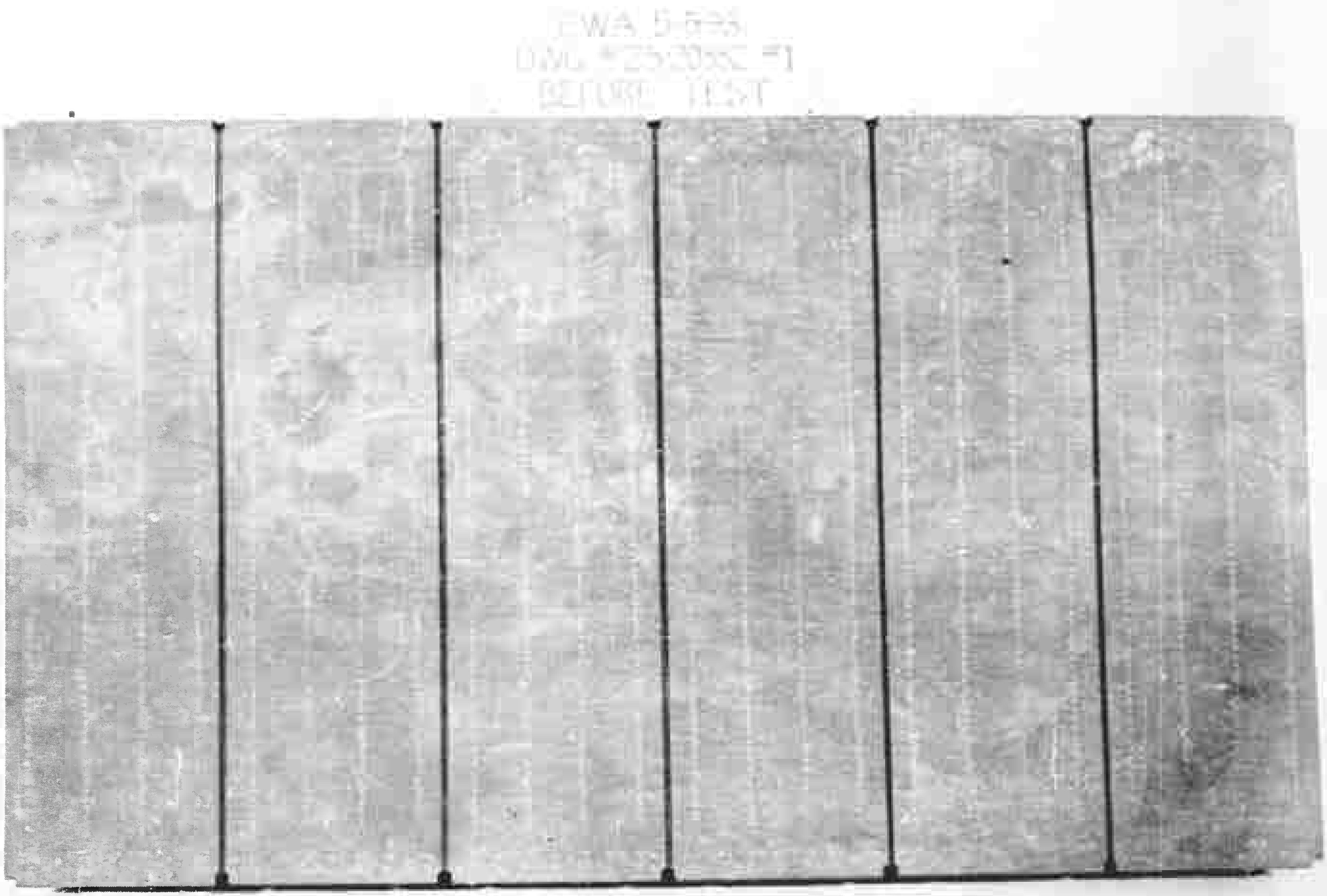


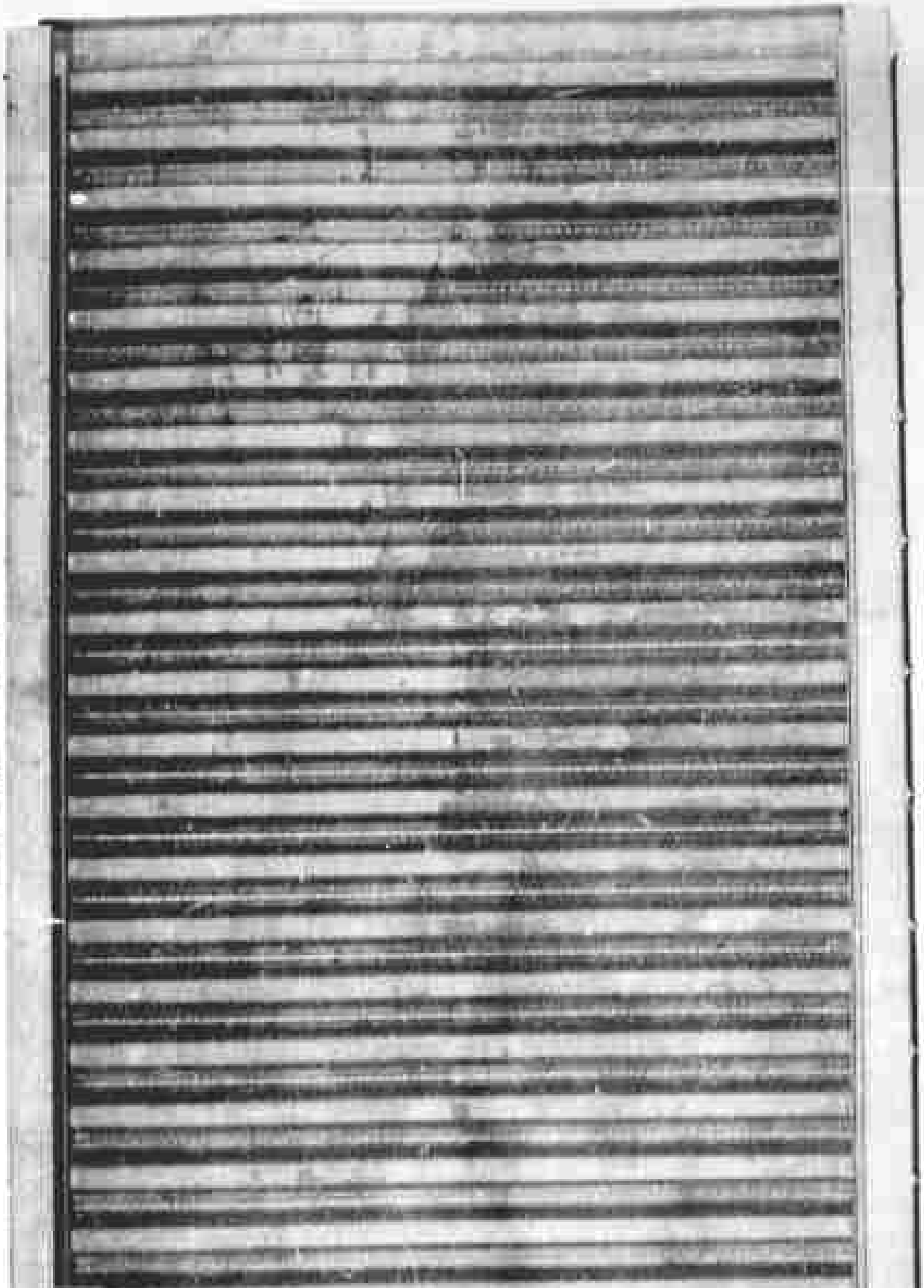
DS-I PANEL #25-29370 3-7-61 2A62515



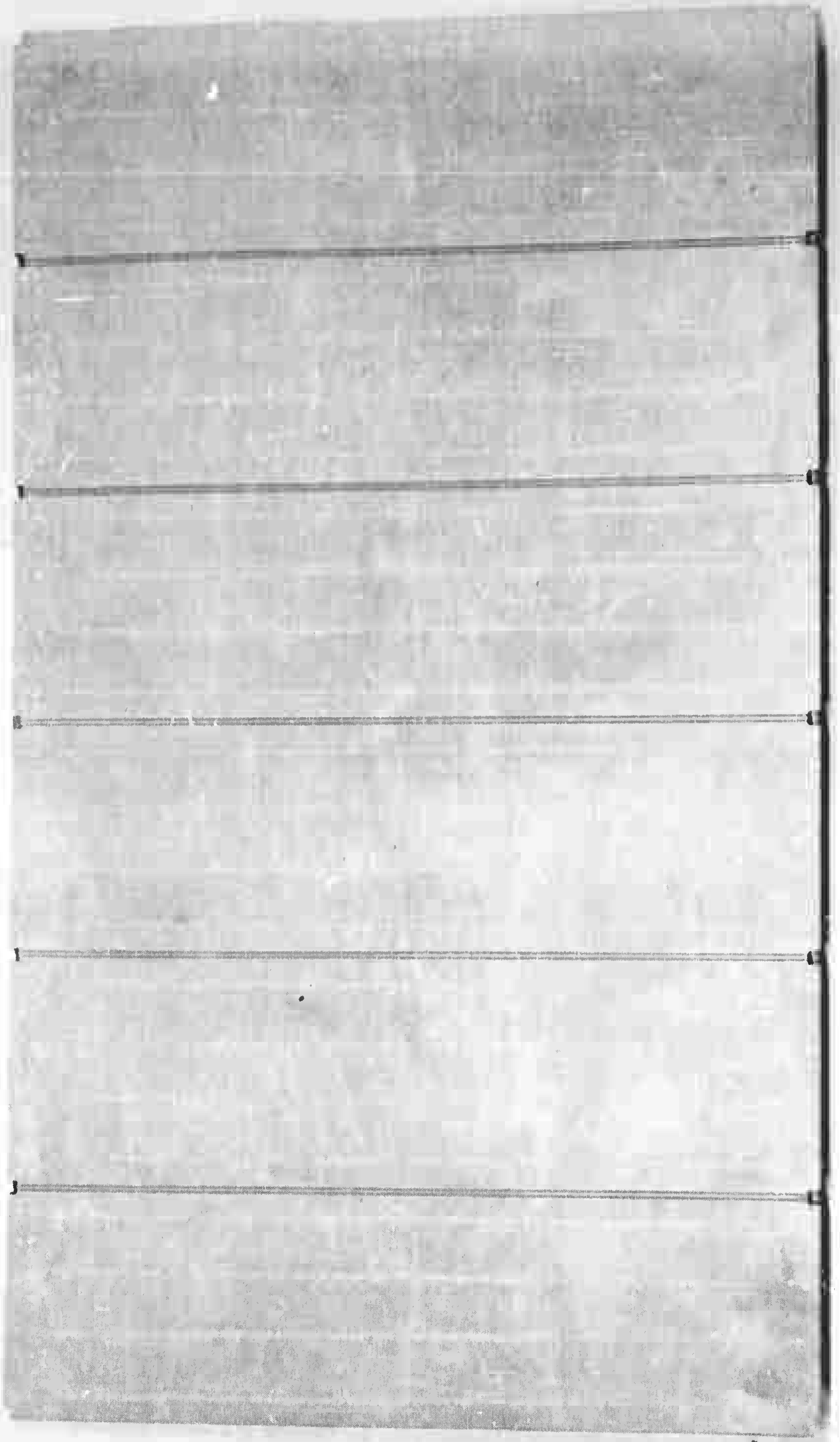
DYNASOAR PANEL TYPE I 11-15-61 2A93065

DS-I PANEL #25-20352 3-7-61 JA62513



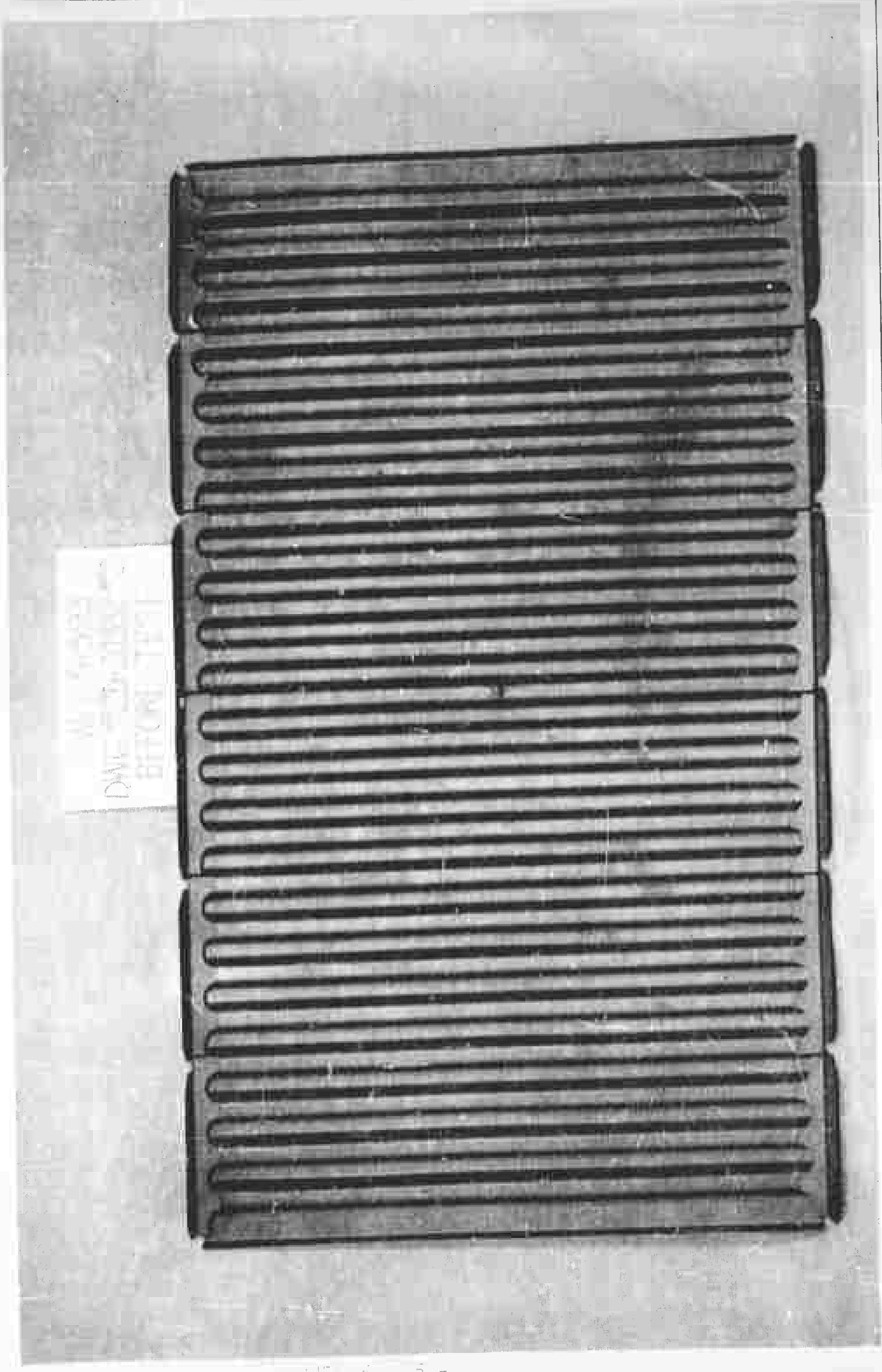


DS-I PANEL #25-20352 3-7-61 2A62509



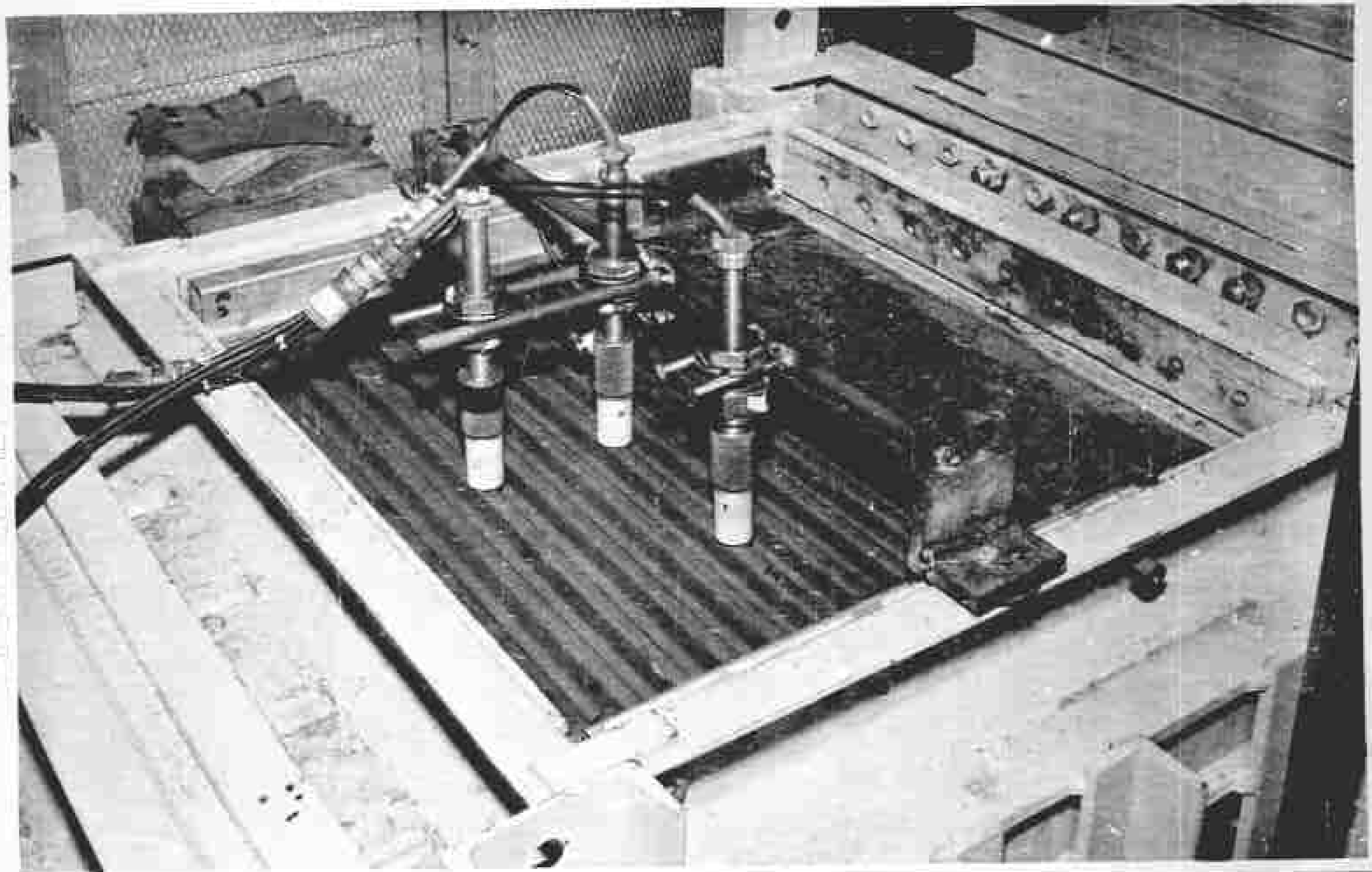
DS-I WING PANELS EWA 5-593 3-16-61 2A65045

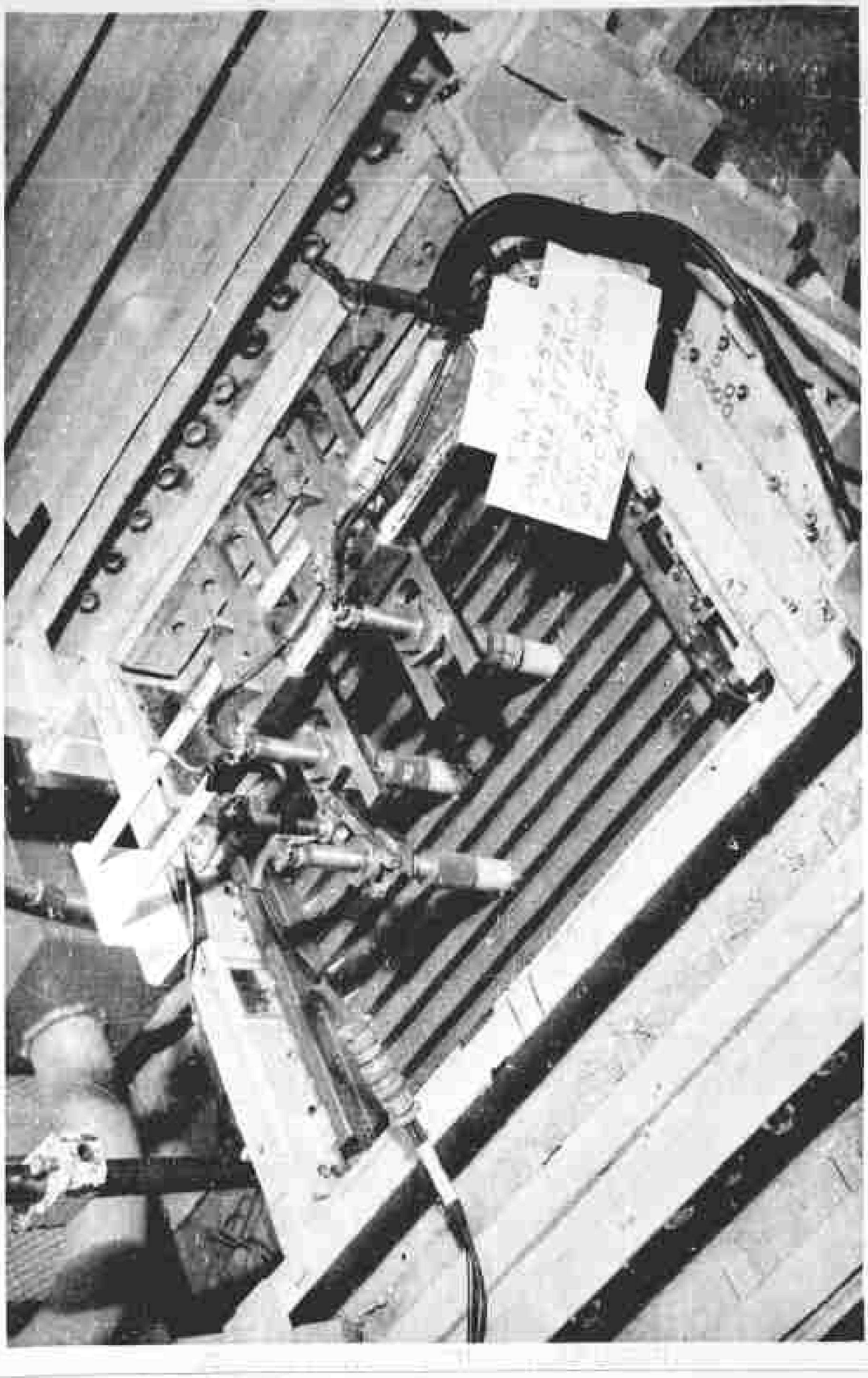
U3-4071-1000 (was BAC 1546-L-R3)



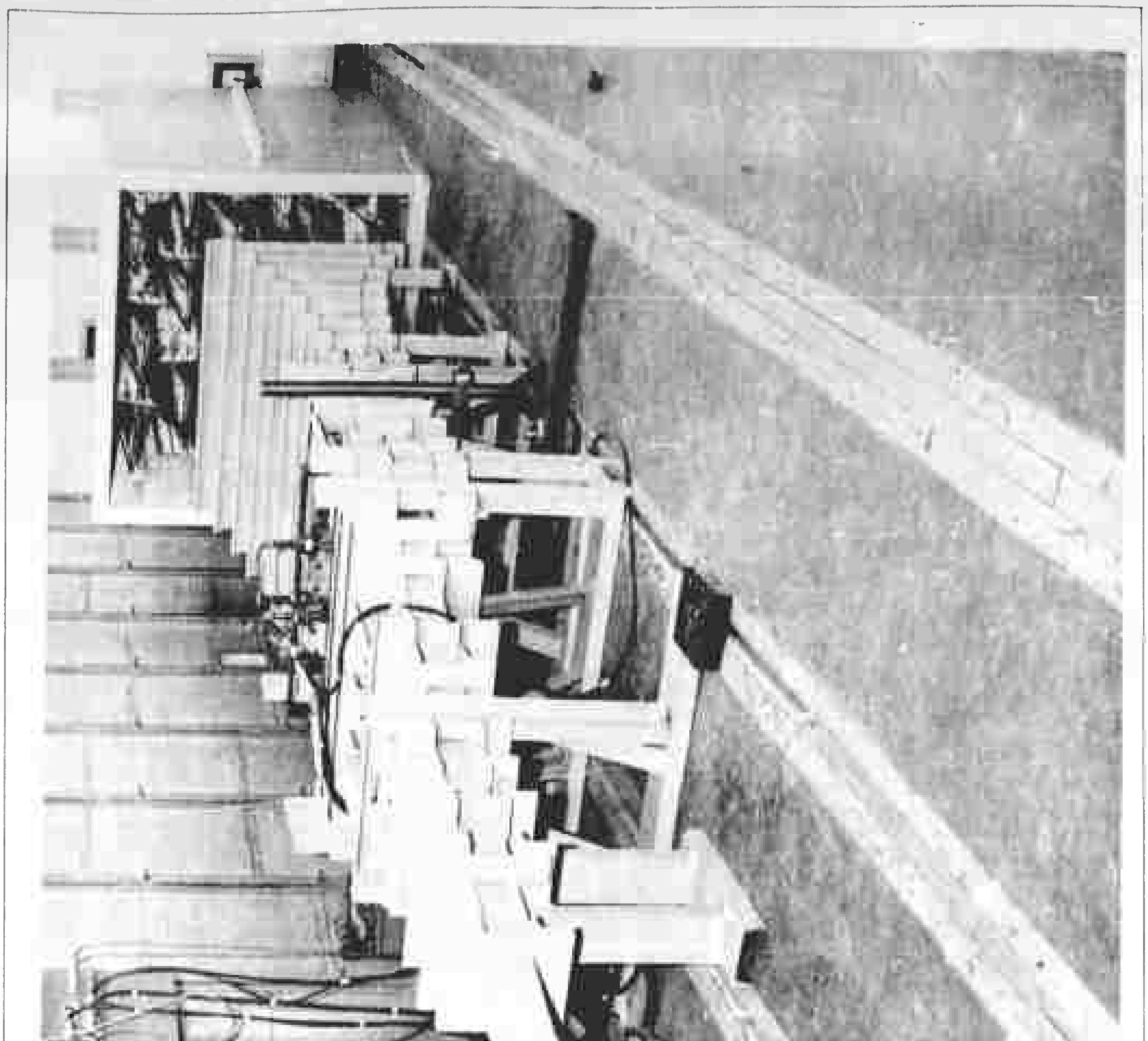
DS-I WING PANELS EWA 5-593 3-16-61 2A63050

DYNASOAR NON-INSULATED PANEL SONIC TEST SETUP 12-9-60 2A53510

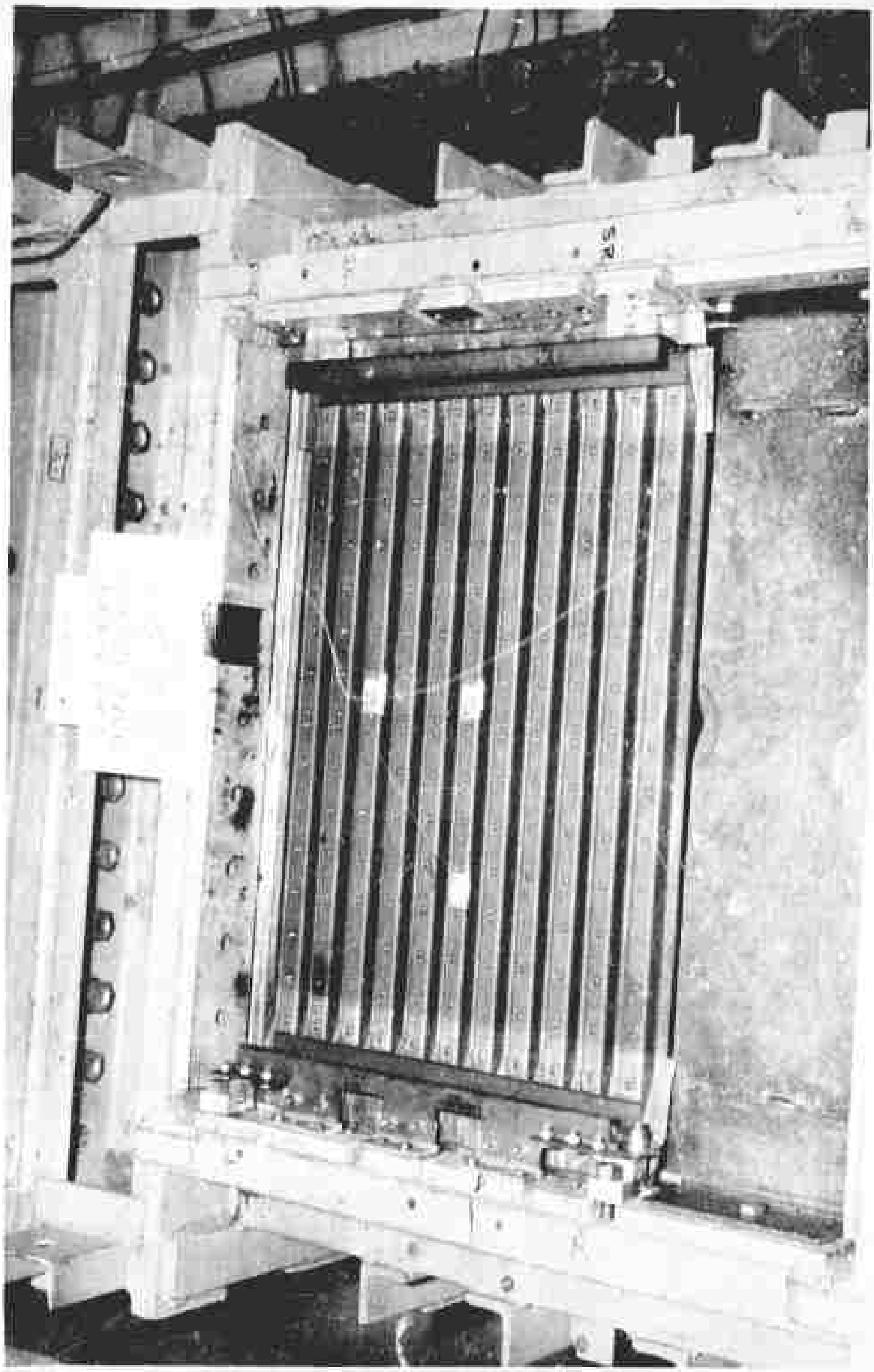




DS-1 EWA 5-593 PANEL 1499 TEST SETUP 5-10-61 2A66576

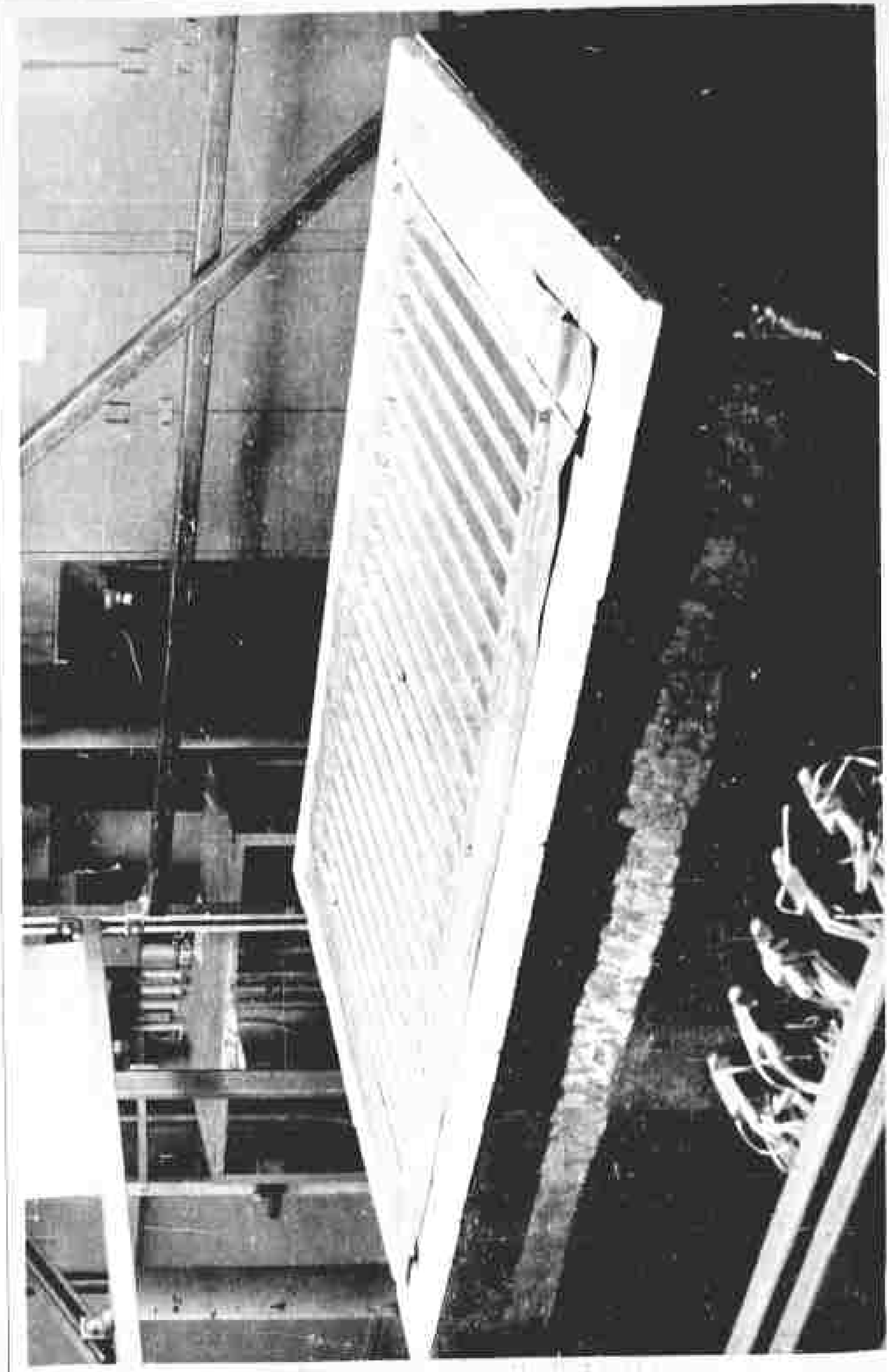


DYNASOAR NON-INSULATED PANEL SONIC TEST SETUP 12-9-63 2A53509

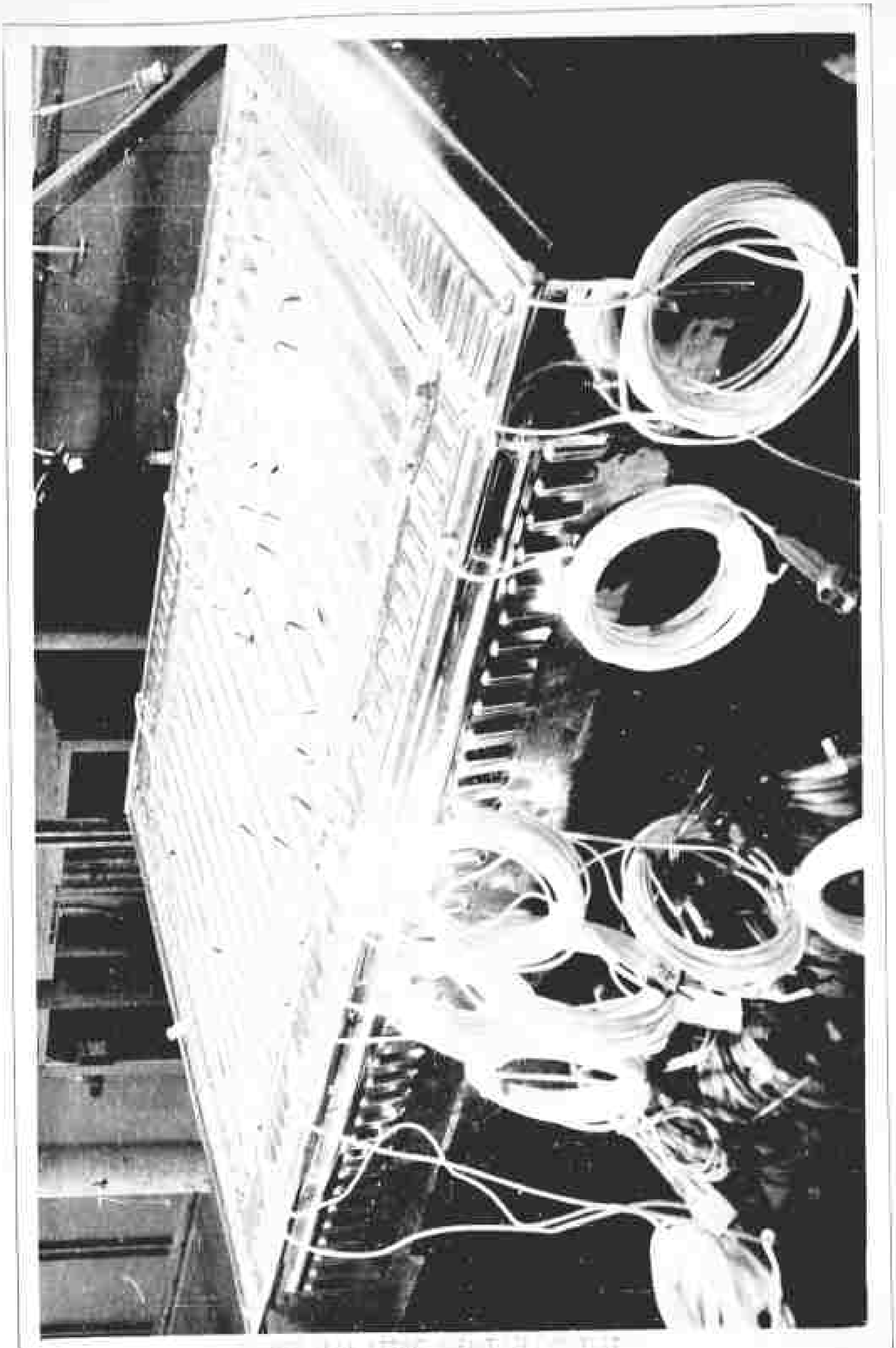


DS-I EWA 5-593 PANEL 1499 TEST SETUP
5-10-61

2A66575



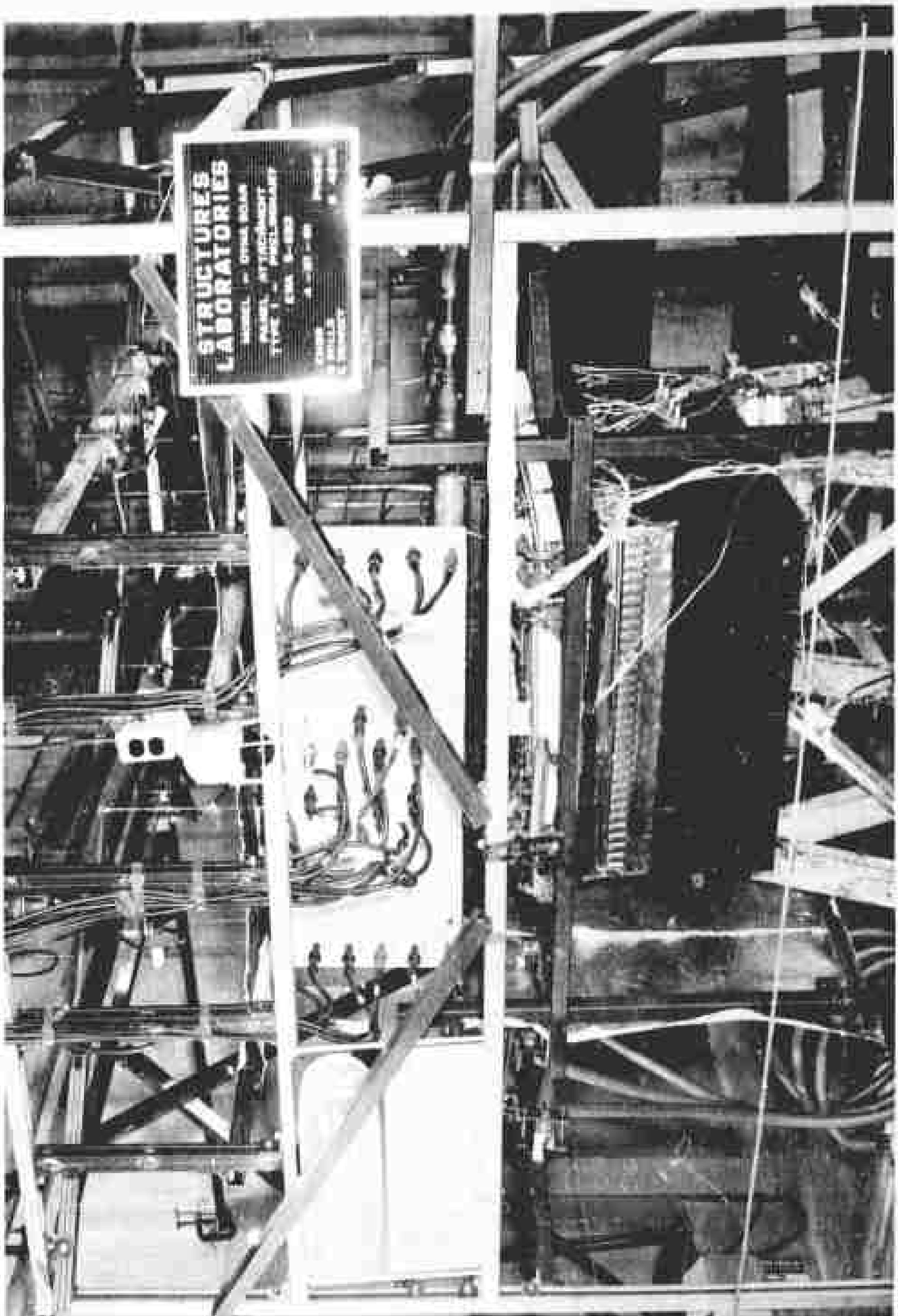
PANEL ATTACHMENT TEST EWA



DS-I - WING PANEL TEST SETUP EWA 5-593
4-21-61
2A65284

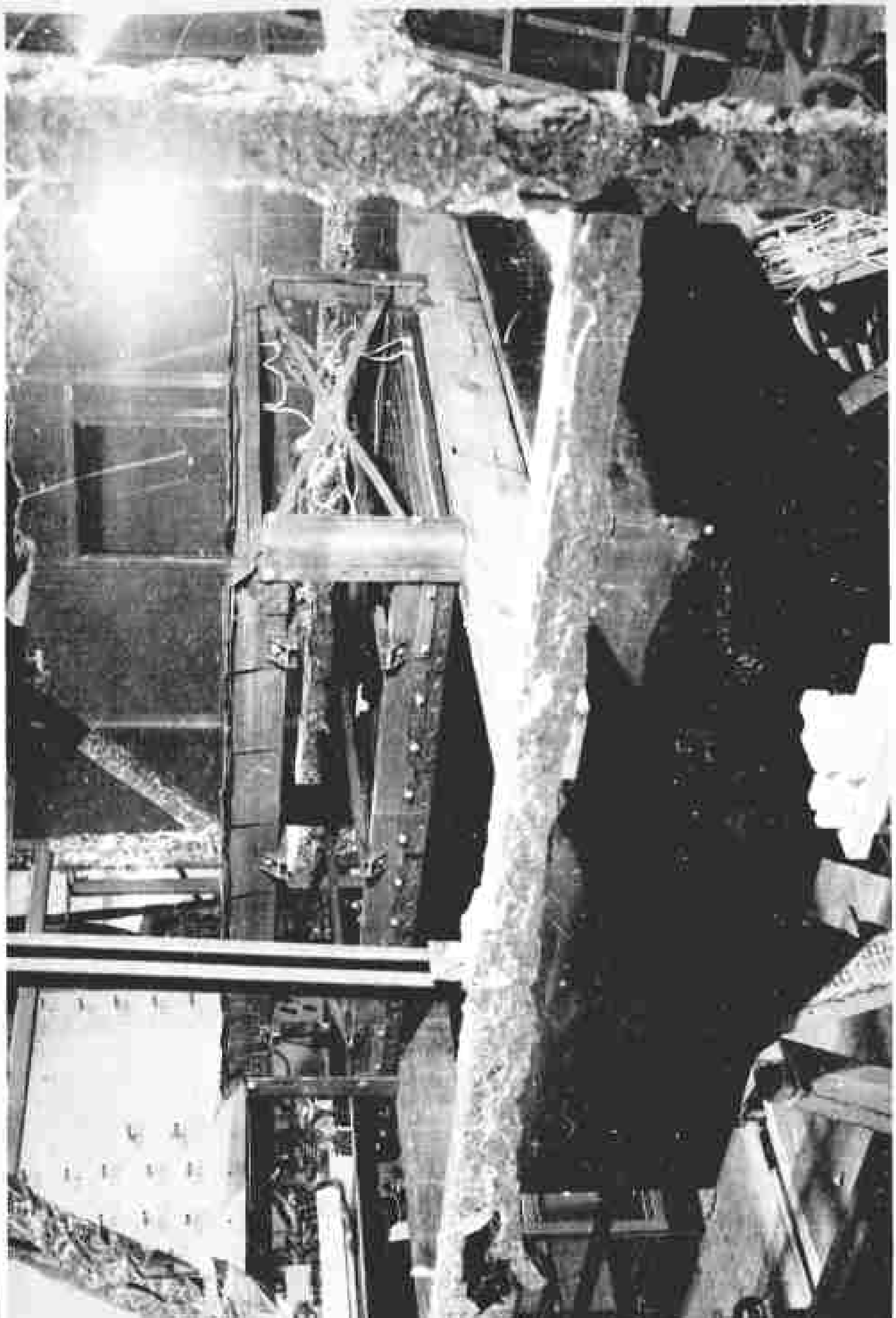
U3-4071-1000 (was BAC 1546-L-R3)

DS-I WING PANEL TEST SETUP EWA 5-593
5-2-61 2A65952

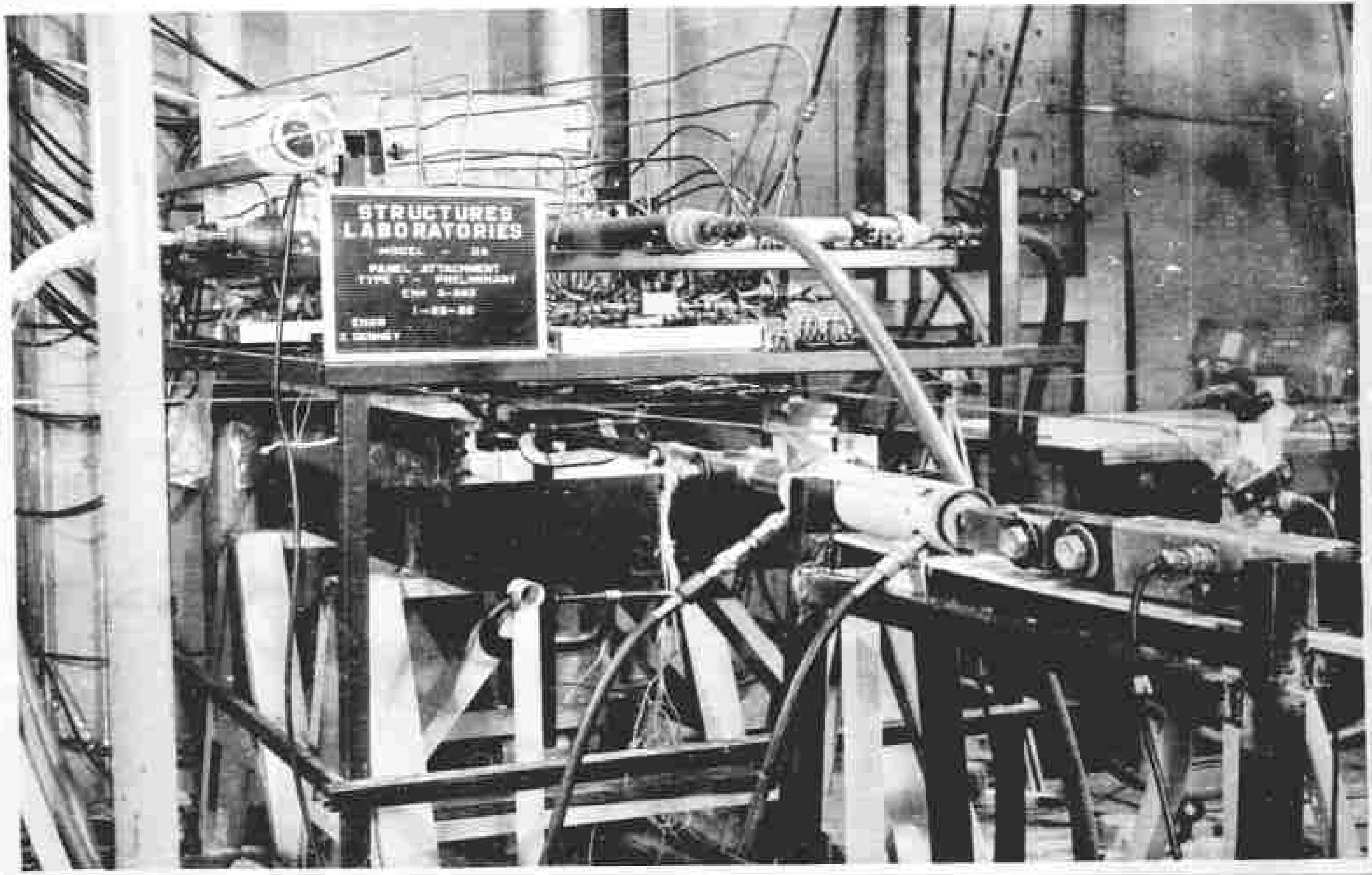


TEST SETUP, [illegible]

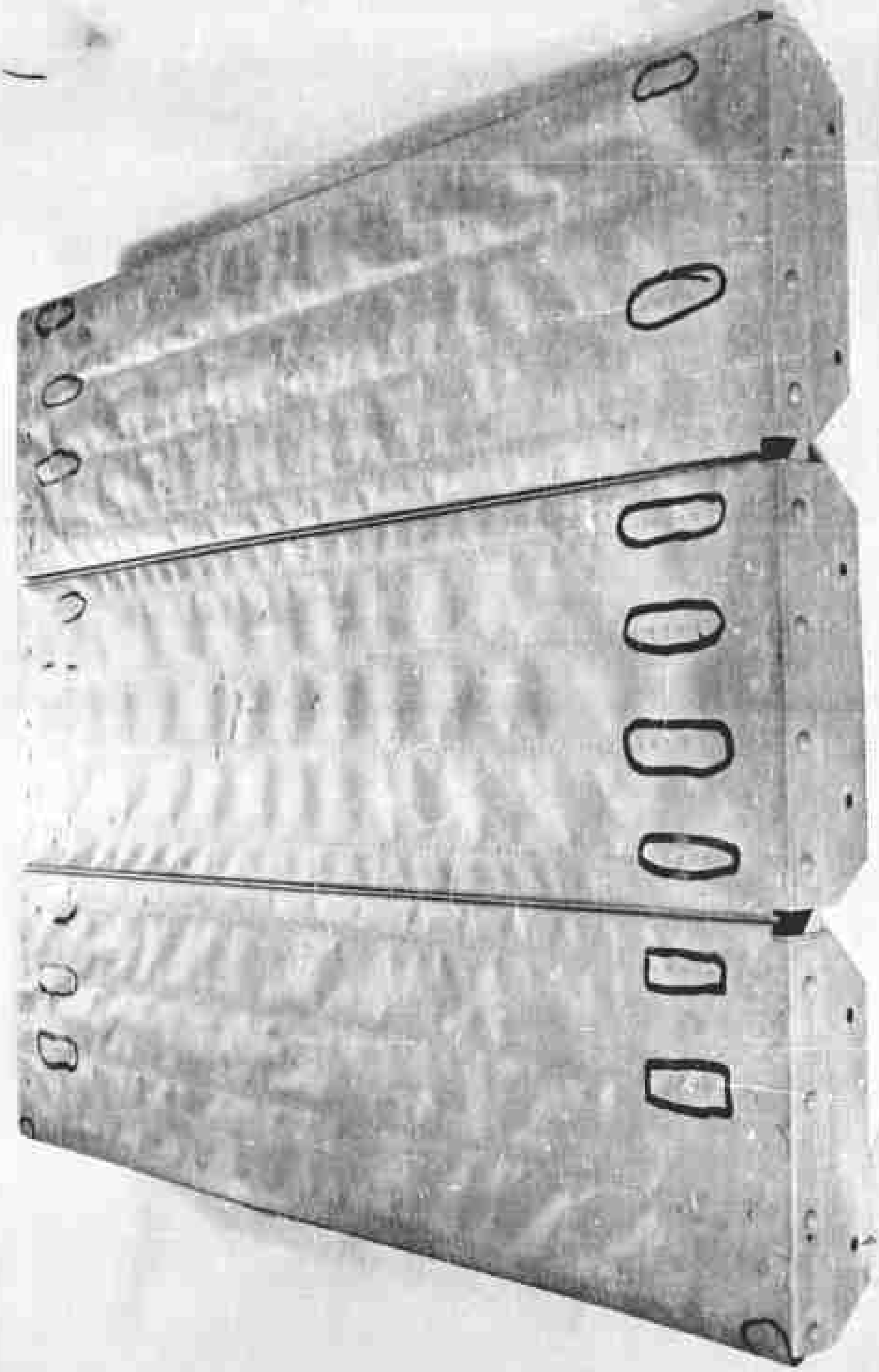
THERMO-FATIGUE TEST OF SIMULATED WING PANEL 2AB6848
DS-I 8-21-61



DS-J WING PANEL SHEAR TEST 1-26-62 2A100019

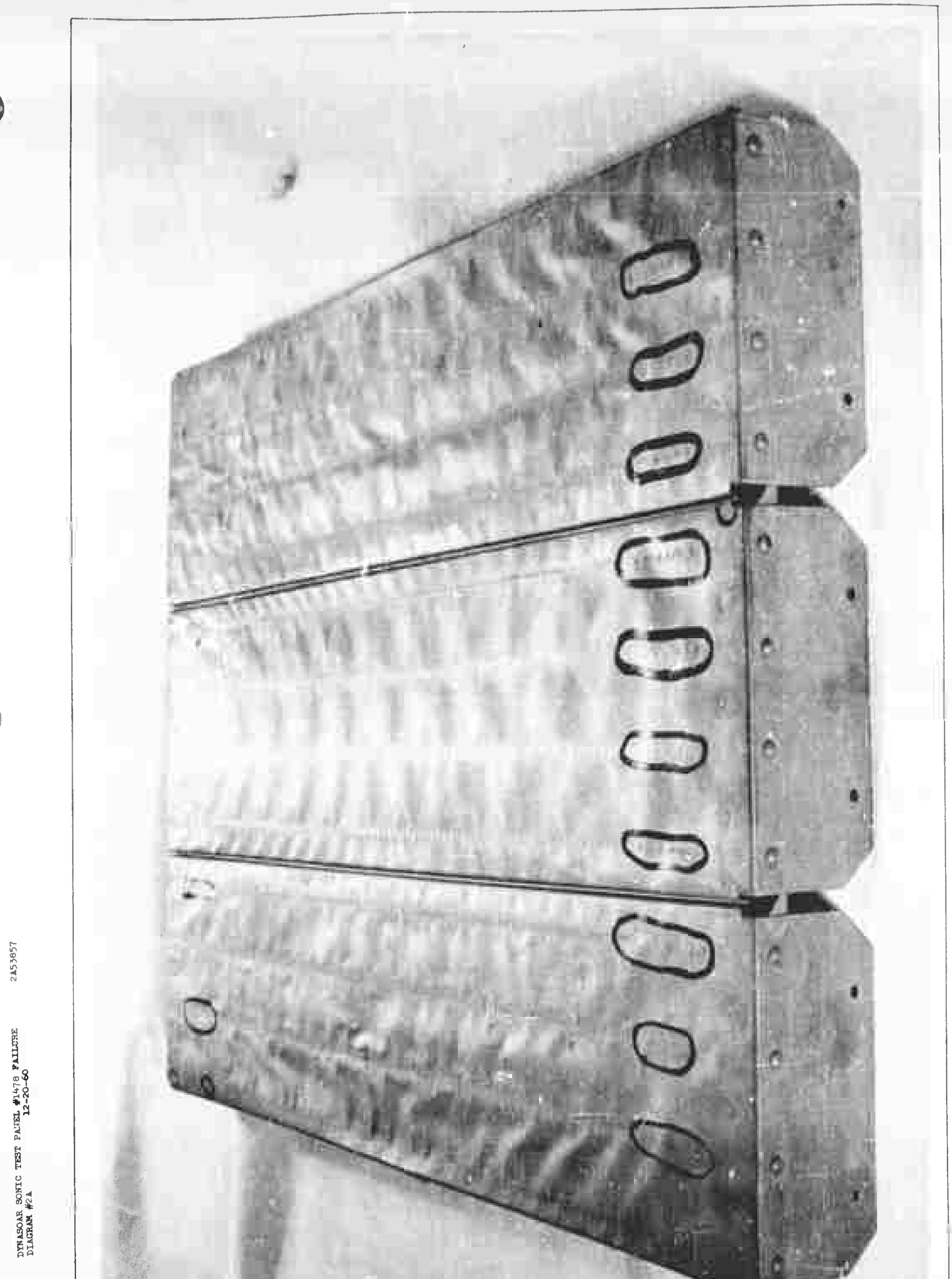


U3-4071-1000 (was BAC 1546-L-R3)



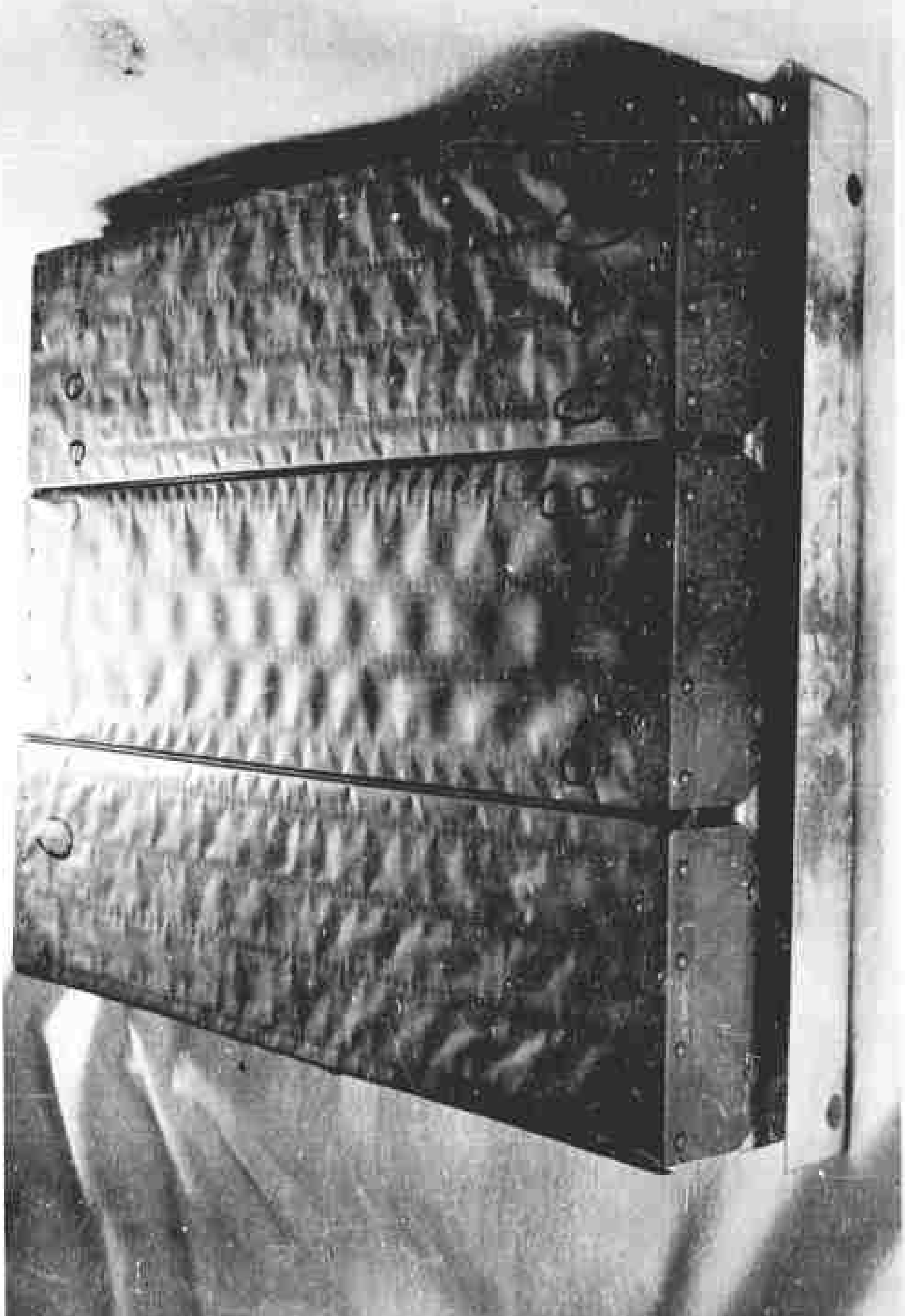
DYNASOAR SONIC TEST PANEL #1477 FAILURE 2A53856
DIAGRAM #2A 12-20-60

SONIC TEST AND 15 MINUTE HEAT TEST



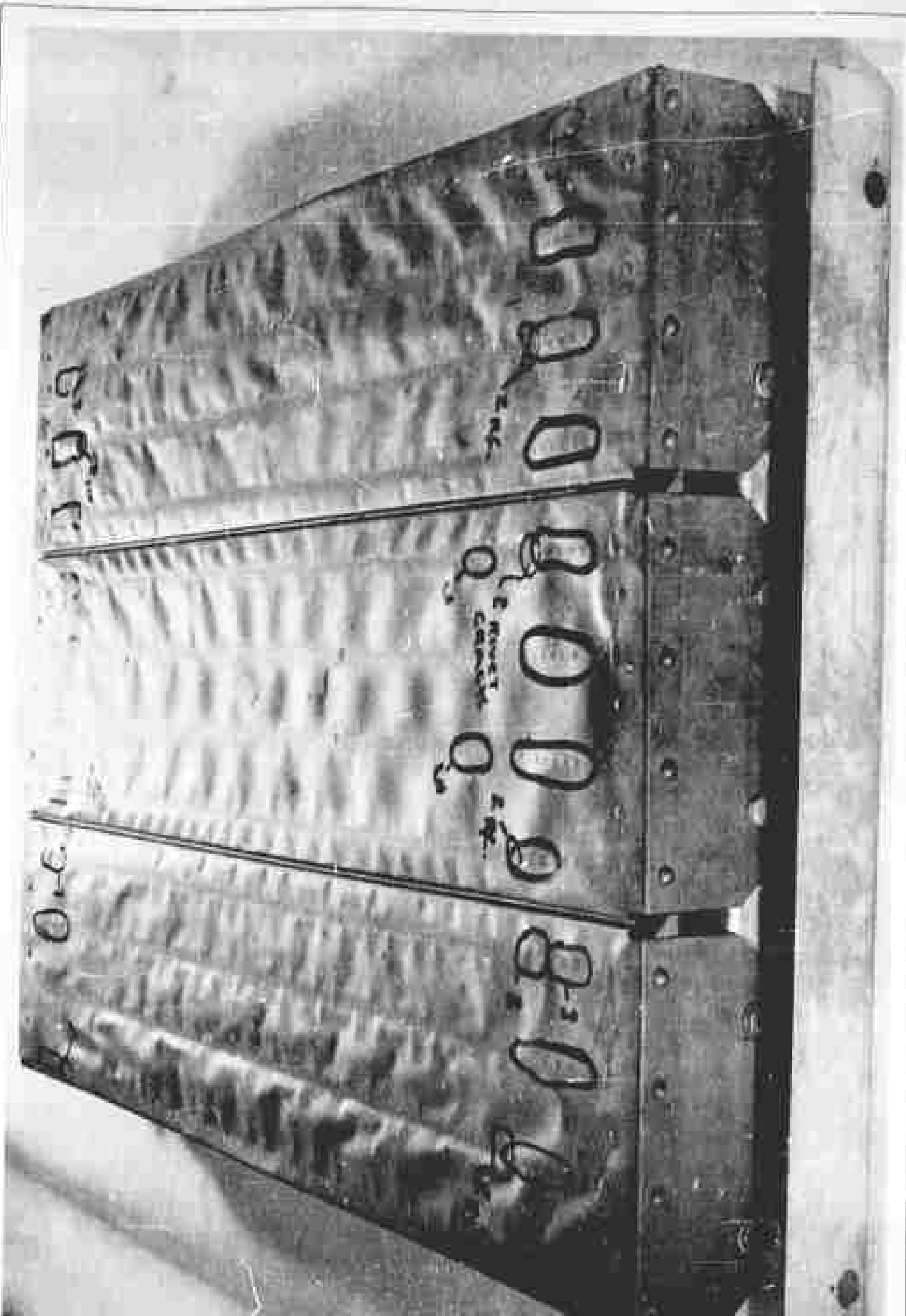
PANEL 5-0344 (1478) FAILURES AFTER 5 MINUTE SONIC TEST AND 15 MINUTE HEAT TEST

DYNASOAR SONIC TEST PANEL FAILURE - HEAT PANEL 2A53842
NO. 3 RE-TEST 12-19-60



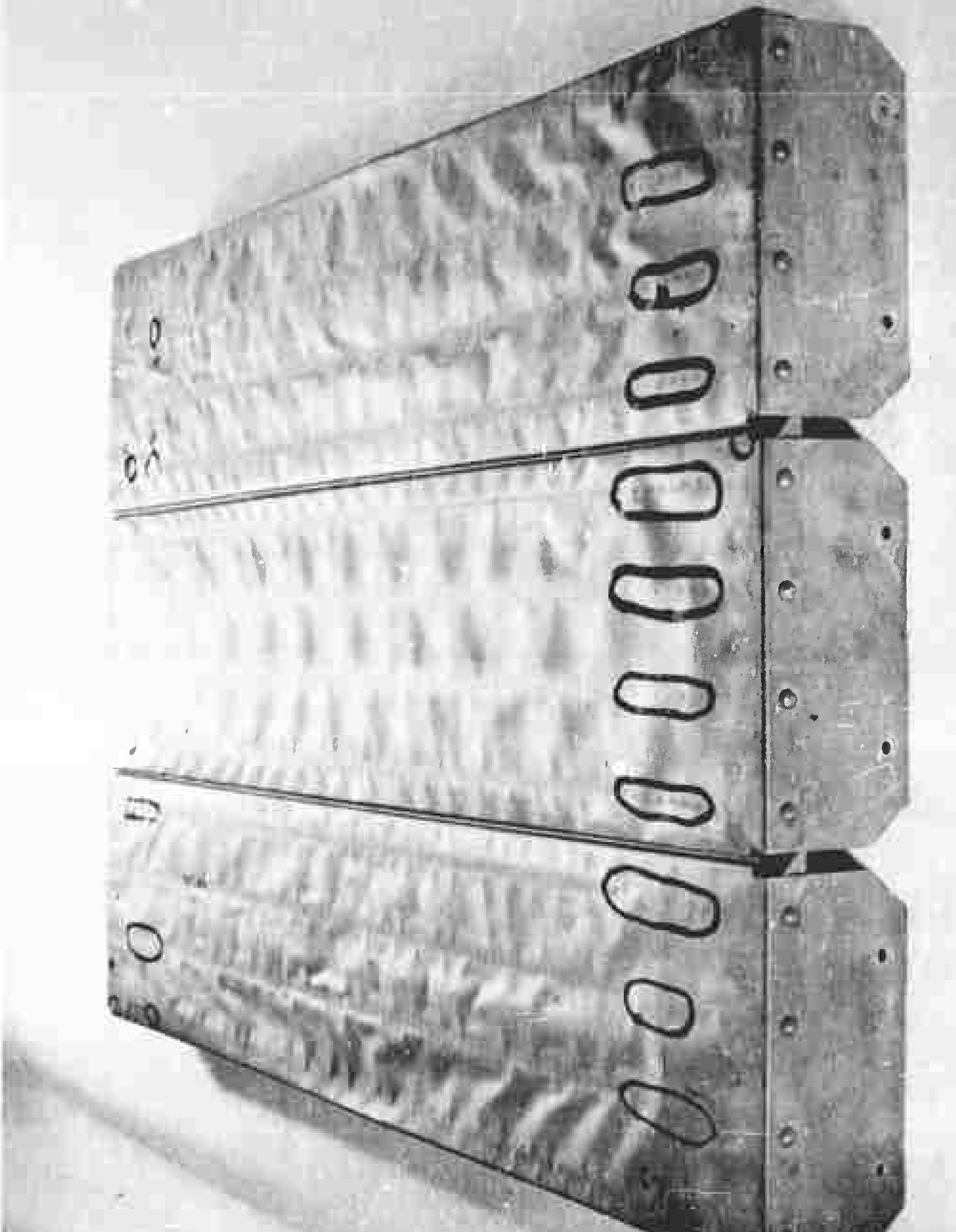
P NEL 25-.0344 1479) FAILUR AFT. 5 MINUT
SONIC TEST AND 15 INUT HEAT TEST

DS-I PANEL #1477 SONIC TEST FAILURE DIAGRAM 12-28-60 2A54930



PANEL 5-10344 (1477) FAILURES AFTER 50 MINUTE SONIC TEST AND 15 MINUTE HEAT TEST

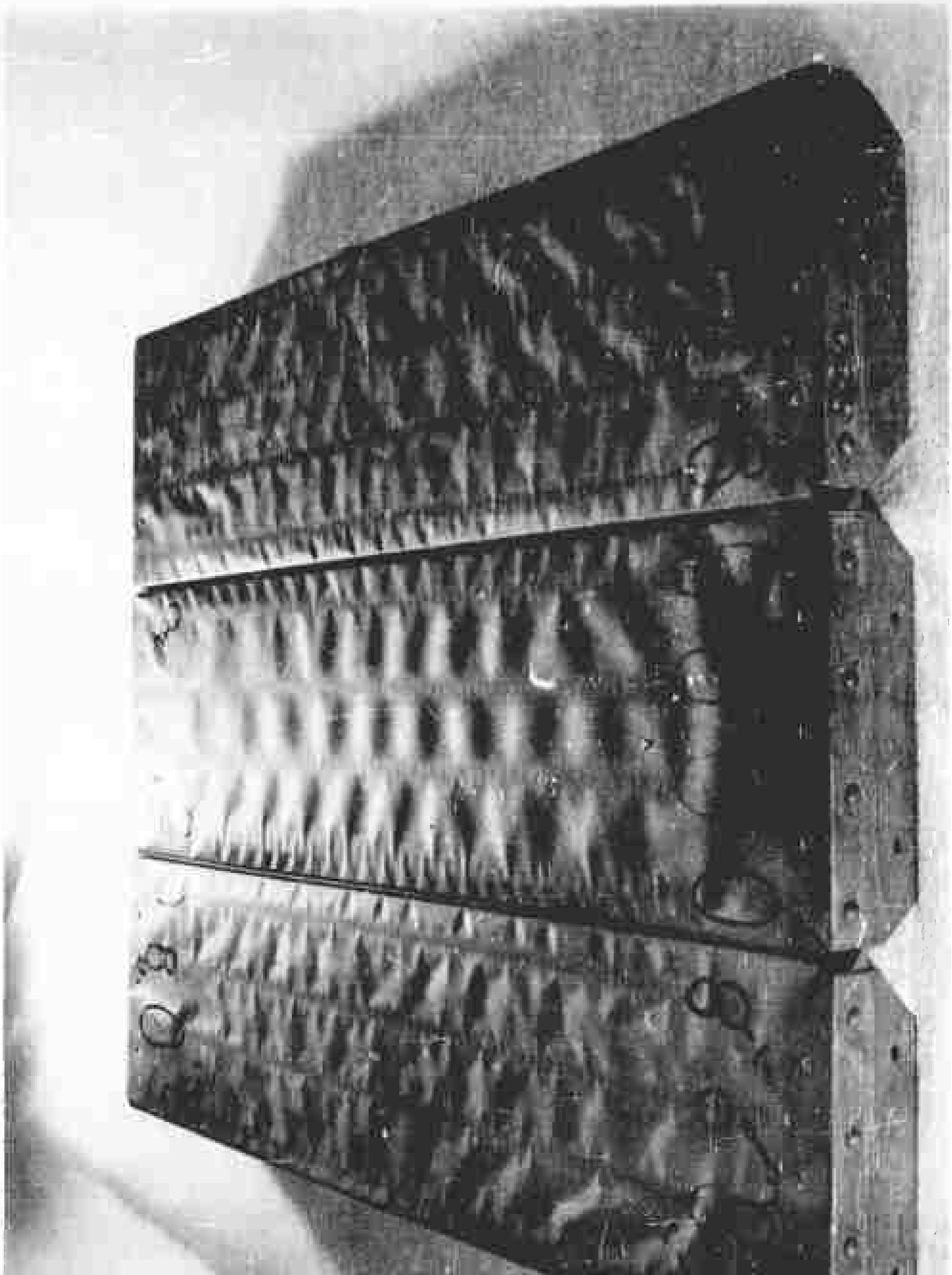
U3-4071-1000 (was BAC 1546-L-R3)



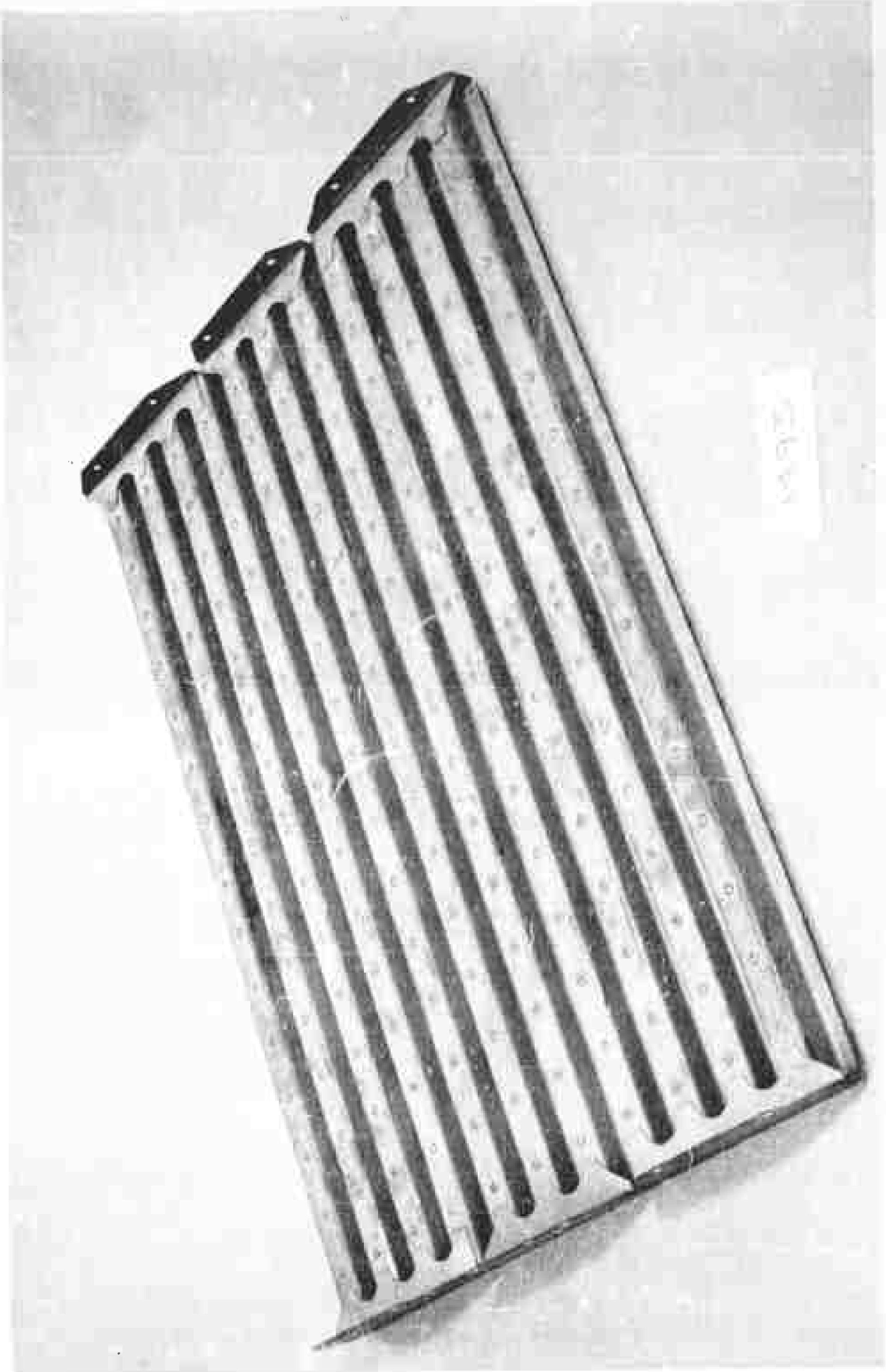
DS-I PANEL #1478 SONIC TEST FAILURE DIAGRAM 2A54931
12-28-60

PANEL 25-2[illegible]044 (1478) FAILURES AFTER 30 MINUTE SONIC TEST AND 15 MINUTE HEAT TEST

DS-I PANEL #1479 SONIC TEST FAILURE DIAGRAM 2A54932
12-28-60



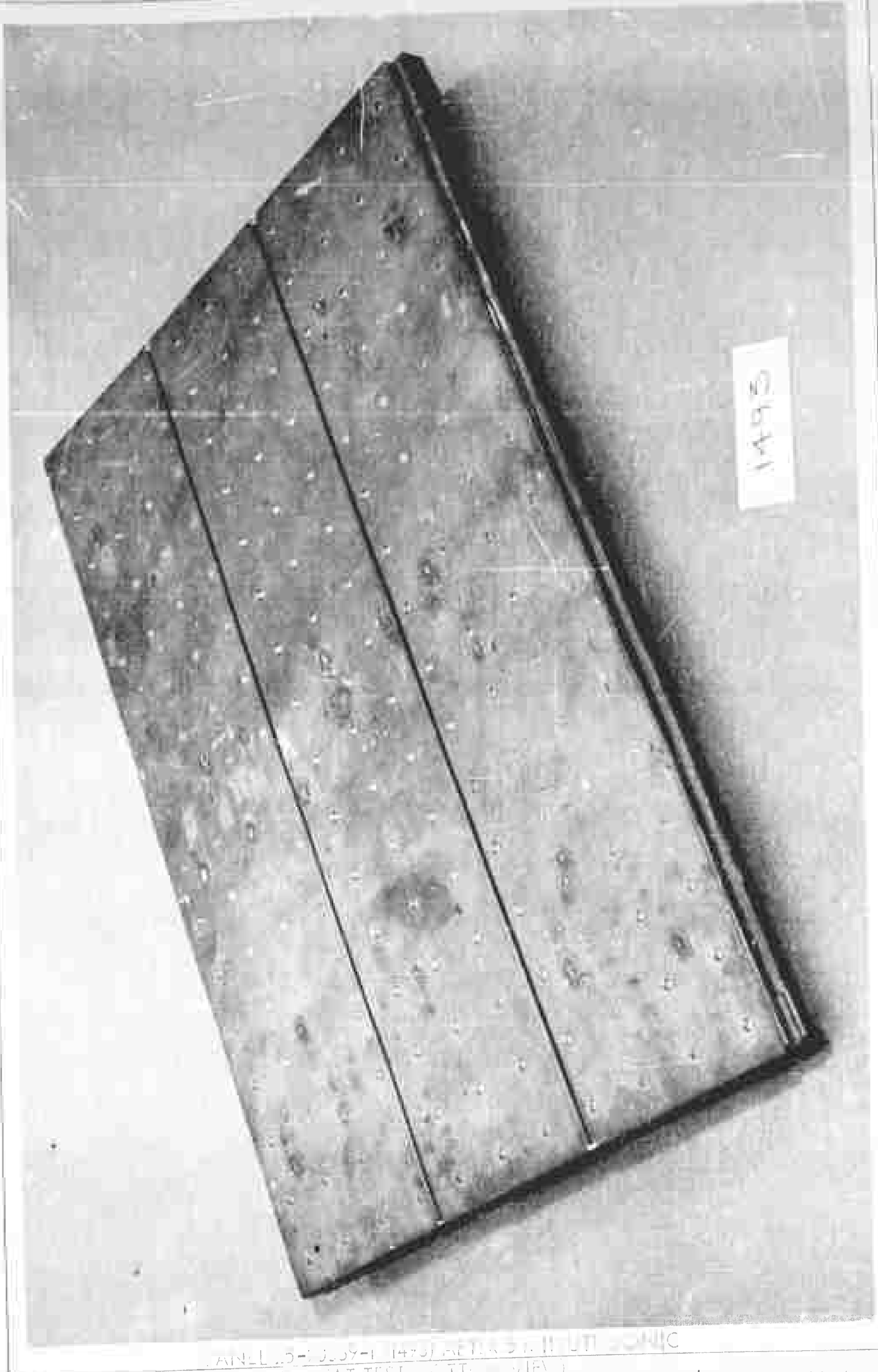
PANEL 25-.0544 (1479) FAILURES AFTER 60 MINUTE SONIC TEST AND 15 MINUTE HEAT TEST



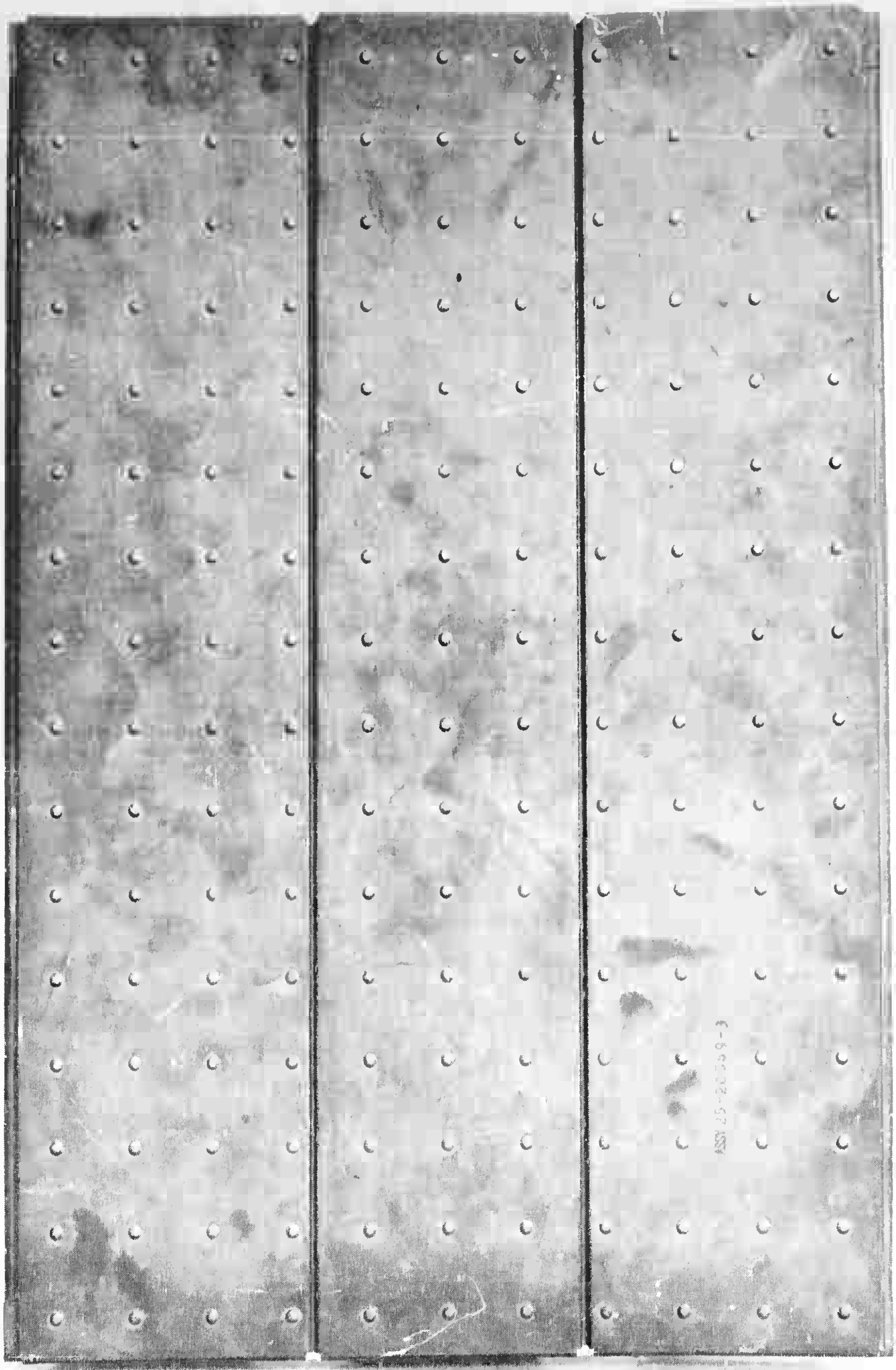
[illegible] (1475) AFTER 3 MINUTE SONIC
TEST AND HEAT TEST (TOP VIEW)

S-I EWA 5-593 AFTER HEAT & SONIC TESTING A66558
5-9-61

DS-I EWA 5-593 AFTER HEAT & SONIC TESTING 2A6655
5-9-61

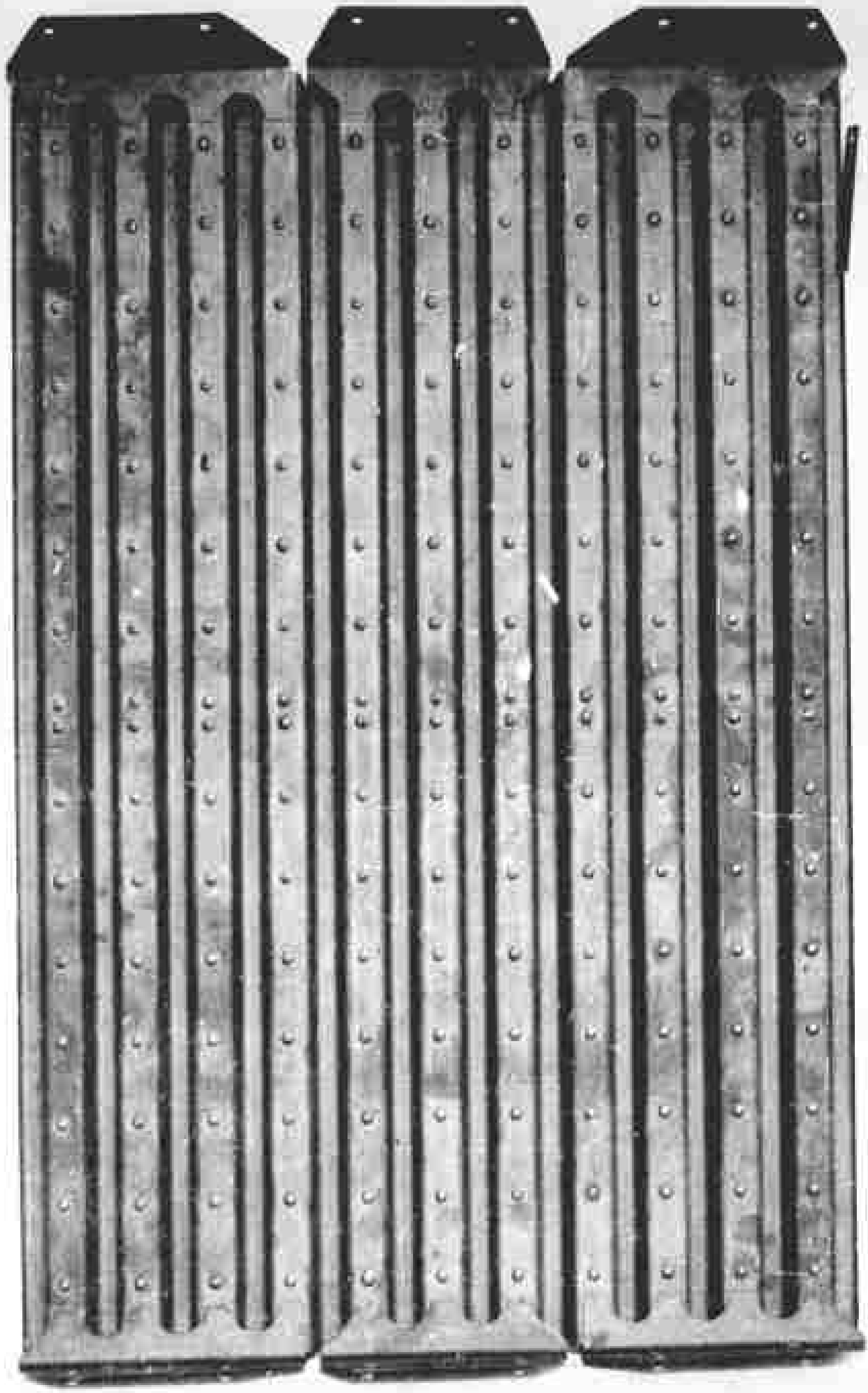


PANEL [illegible] (1493) AFTER [illegible] SONIC
TEST AND HEAT TEST (BOTTOM VIEW)



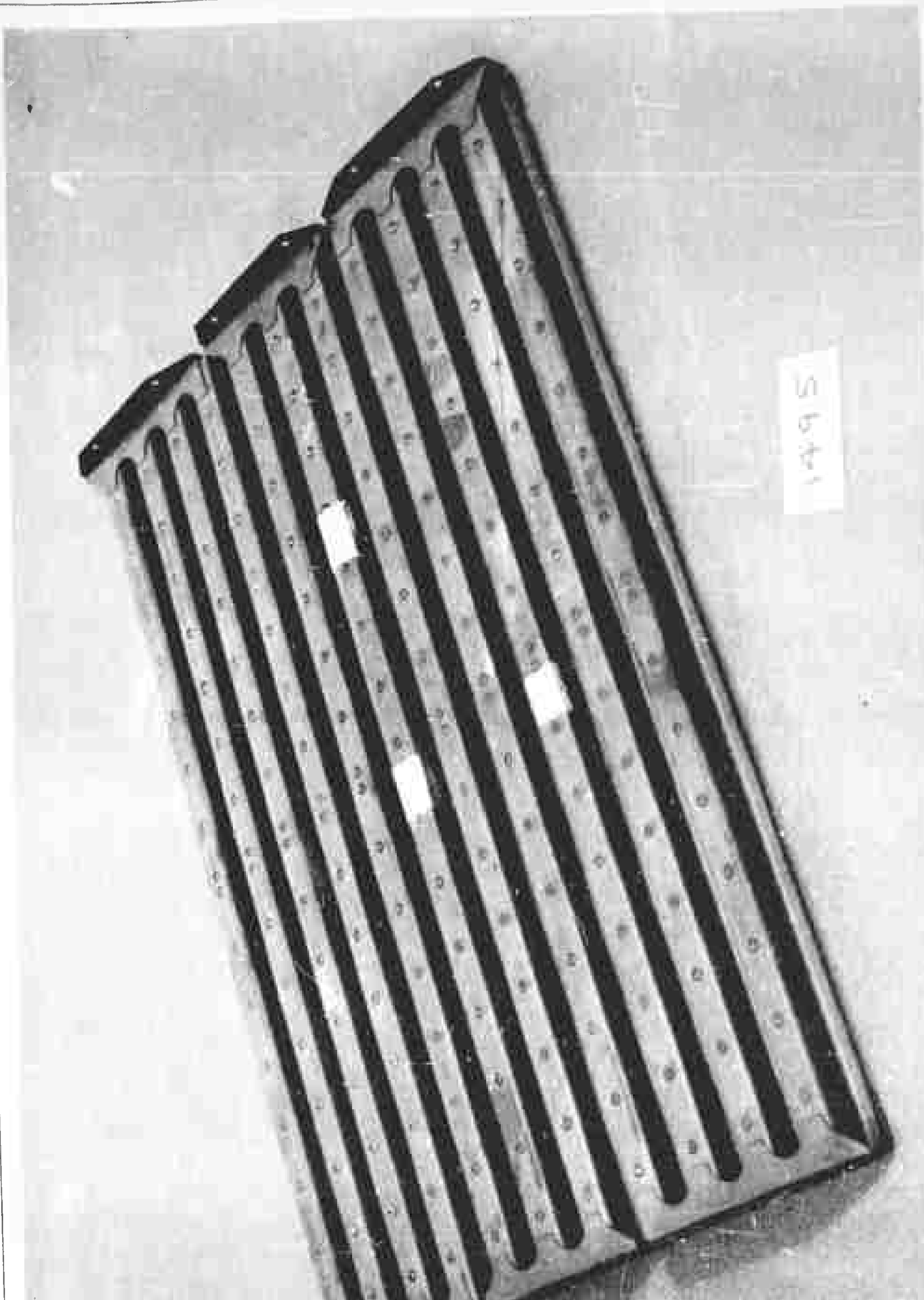
DS-I INSULATED PANEL # 1494 EWA 5598 - 3-28-61
SONIC TEST
2A 3779

PANEL 25-20309-1 (1494) AFTER 54 MINUTE SONIC TEST AND HEAT TEST (TOP VIEW)



DS-I INSULATED PANEL #1494 EMA 5598- SONIC TEST 3-28-61 2A63771

PANEL 25-20359-1 [illegible] AFTER [illegible] MINUTE SONIC TEST AND HEAT TEST (BOTTOM VIEW)

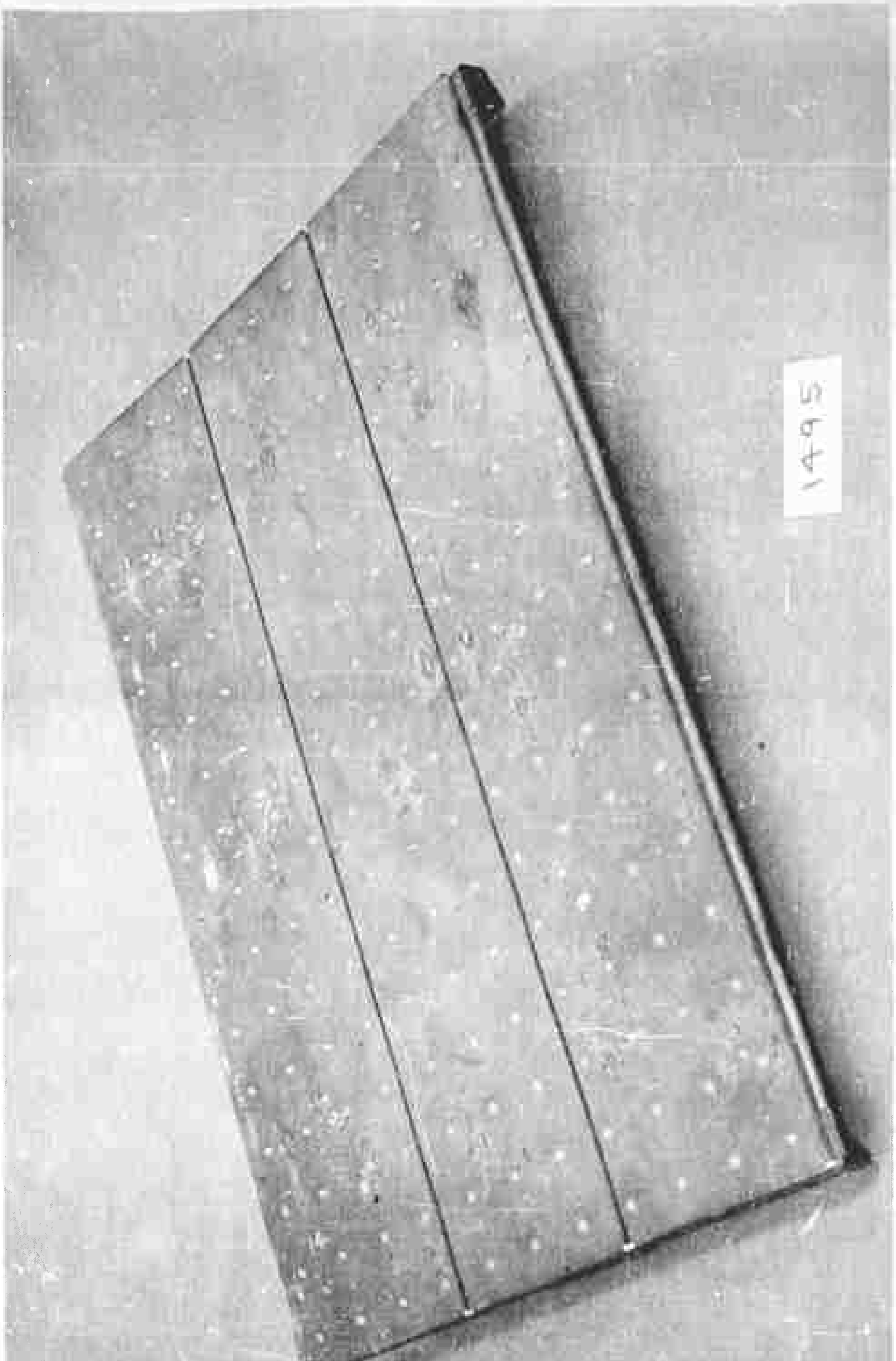


DS-I EWA 5-593 AFTER HEAT & SONIC TESTING 5-9-61 2A66556

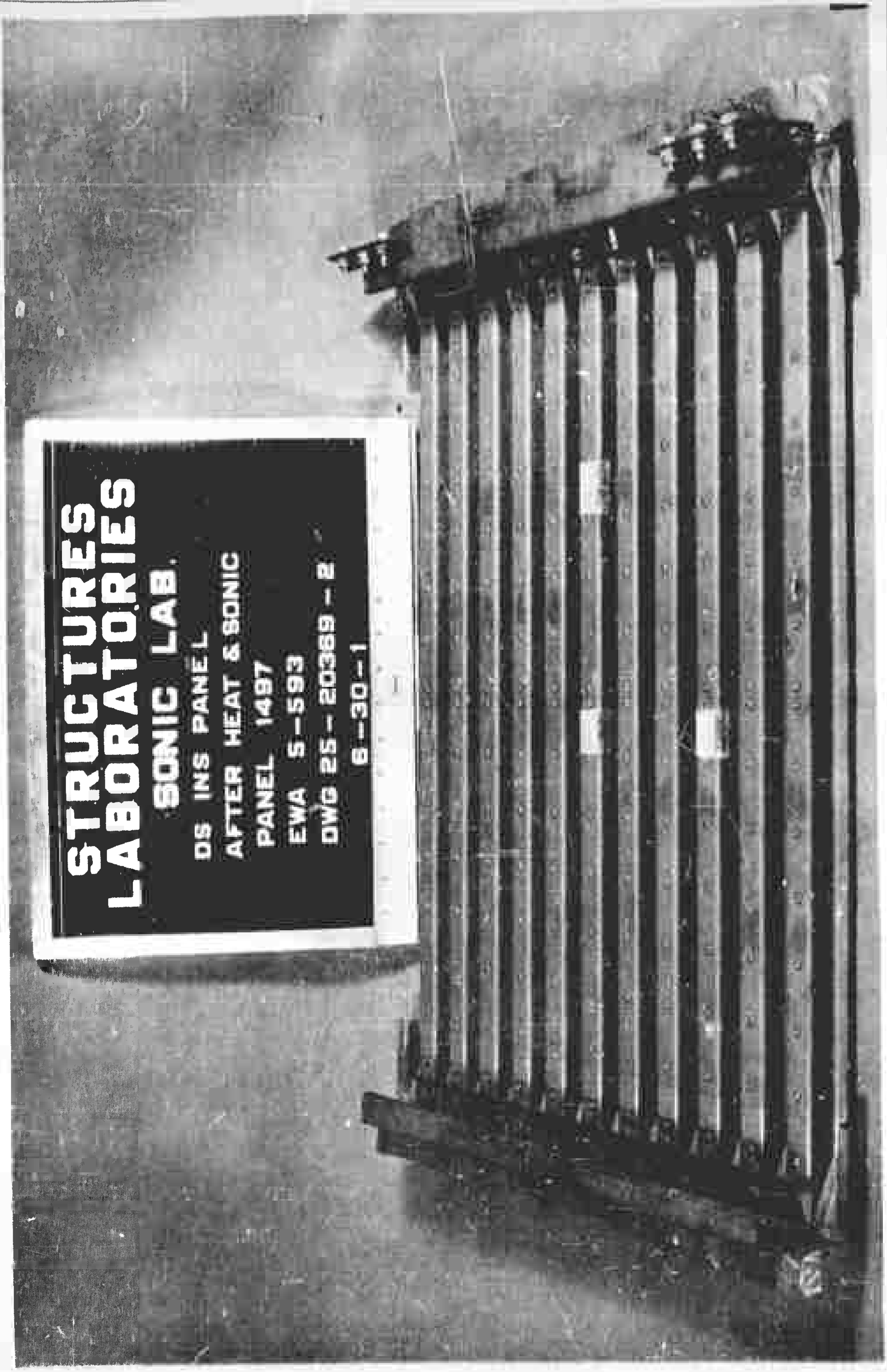
PANEL [illegible]5-[illegible]0839-1 (1495) AFT[illegible] [illegible] SONIC TEST AND [illegible]EAT T[illegible]ST (TOP VI[illegible])

U3-4071-1000 (was BAC 1546-L-R3)

DS-I EWA 5-593 AFTER HEAT & SONIC TESTING 2A66555
5-9-61



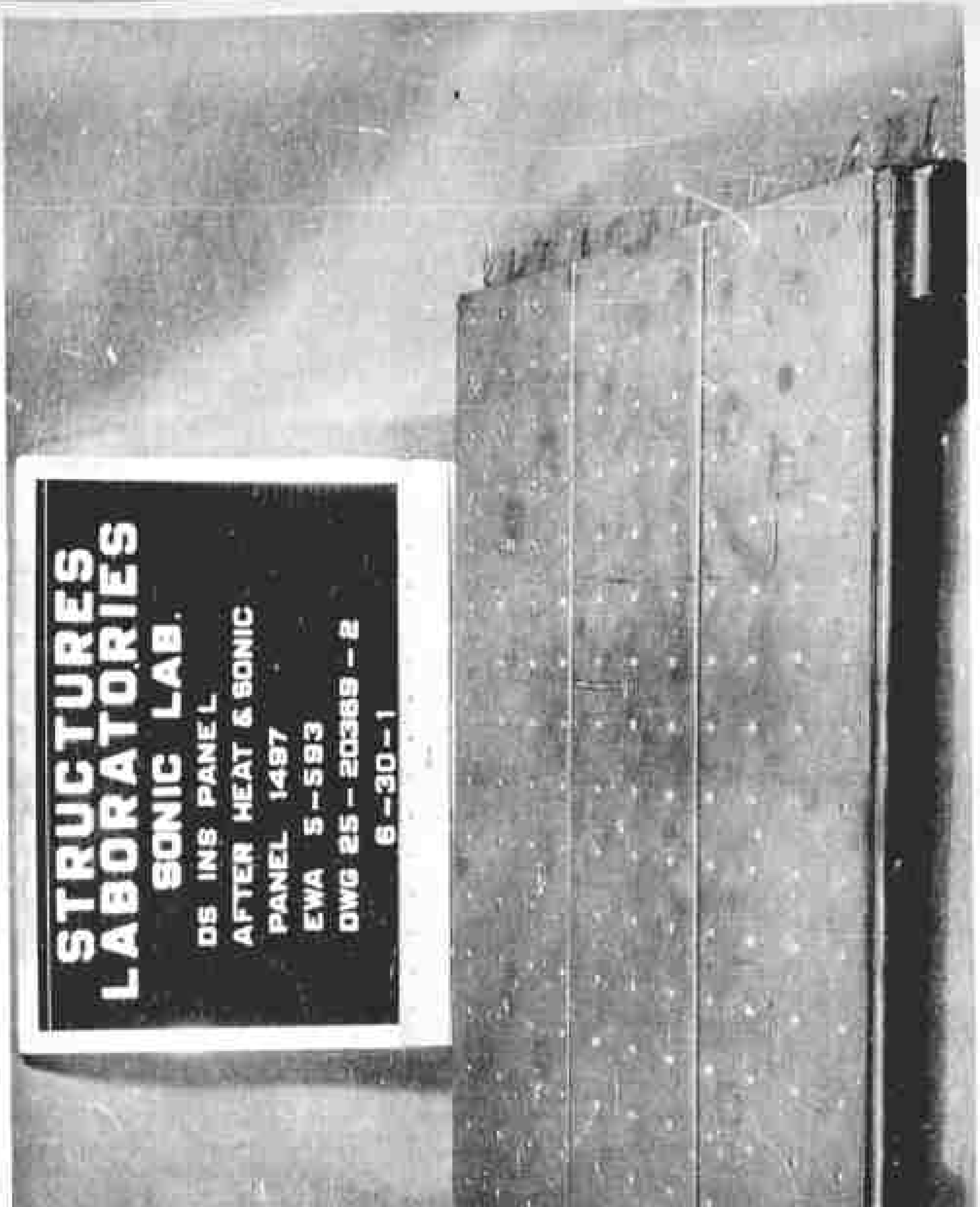
PANEL 15-[illegible]559-1 (1495) AFTER 5 MINUTE SONIC TEST AND HEAT TEST (BOTTOM VIEW)



DS-1 INSULATION PANEL AFTER HEAT AND SONIC TEST PANEL 1497 EWA 5-593 7-3-61

2A82706

PANEL 25-20369-2 (1497) AFTER 5 MINUTE SONIC TEST AND HEAT TEST (TOP VIEW)

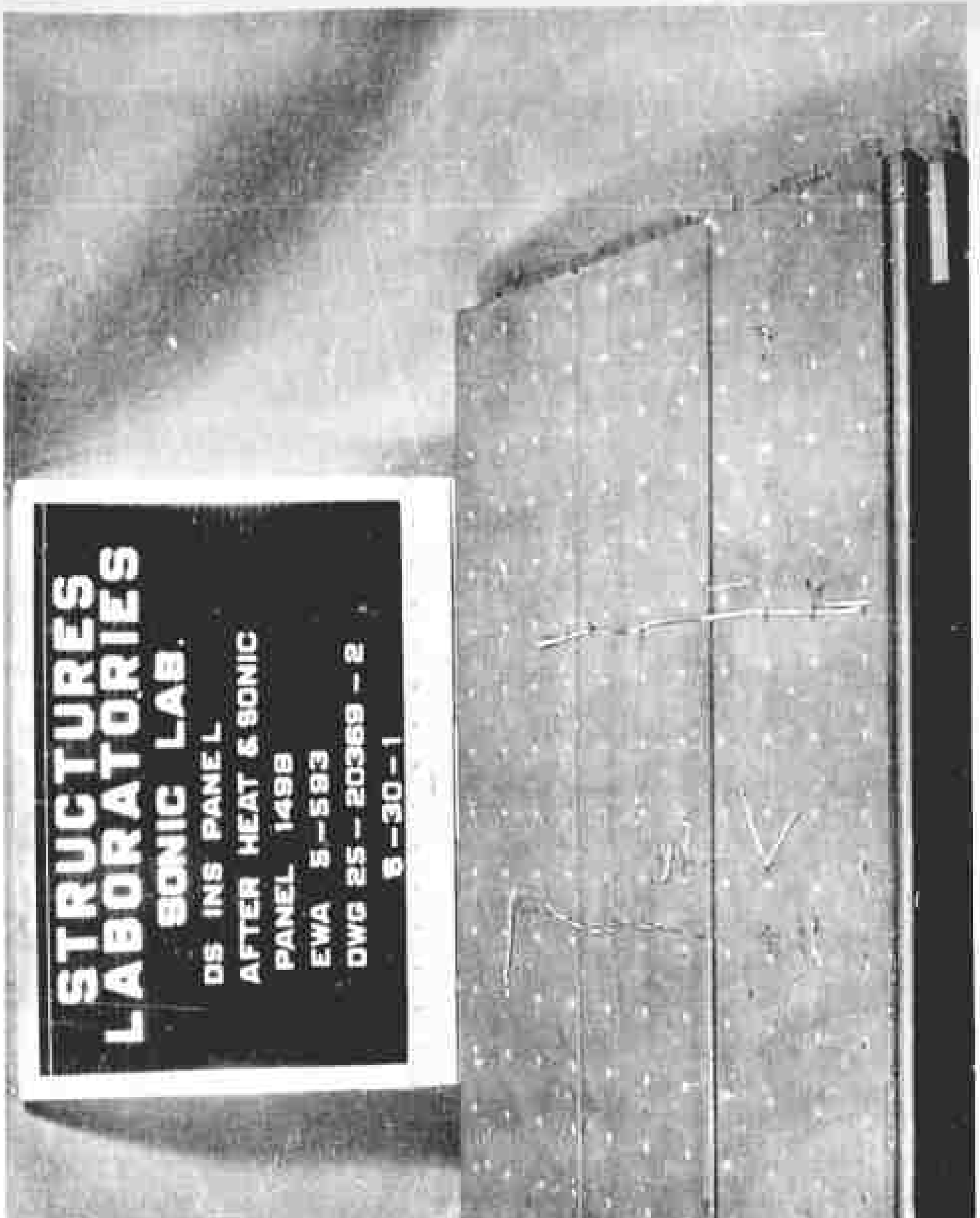


PANEL 25-20369-2 (1497) AFTER 5 MINUTE SONIC TEST AND HEAT TEST (BOTTOM VIEW)

DS-I INSULATION PANEL AFTER HEAT AND SONIC TEST PANEL 1497 EWA 5-593 7-3-61 2A82705

DS-I INSULATION PANEL AFTER HEAT AND SONIC TEST 2A82703
PANEL 1498 EWA 5-593 7-3-61

PANEL 25-20369-[illegible] AFTER 5 MINUTE SONIC TEST AND HEAT TEST TOP VIEW



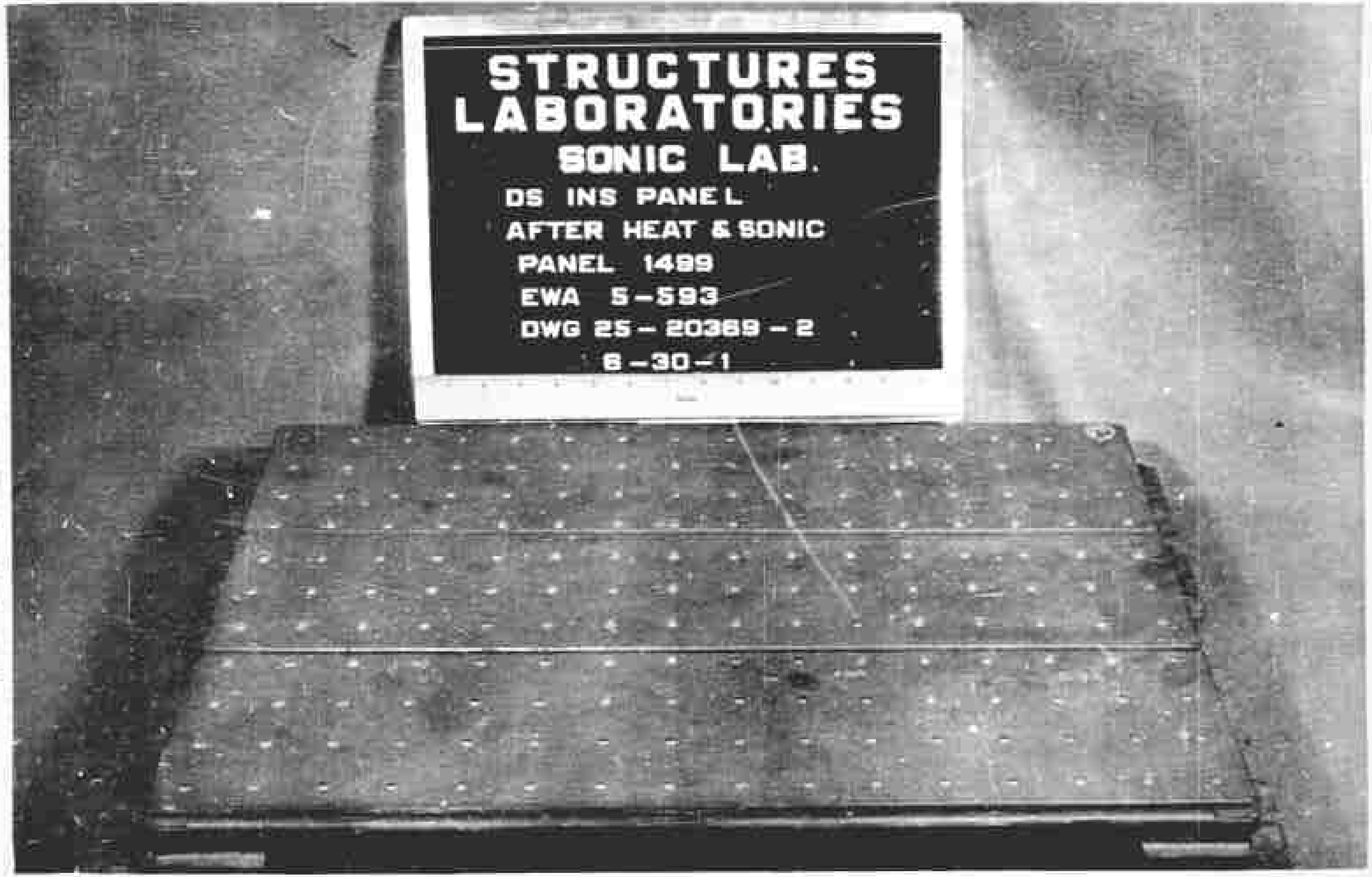
DS-I INSULATION PANEL AFTER HEAT AND SONIC TEST 2A82704
PANEL 1498 EWA 5-593 7-3-61

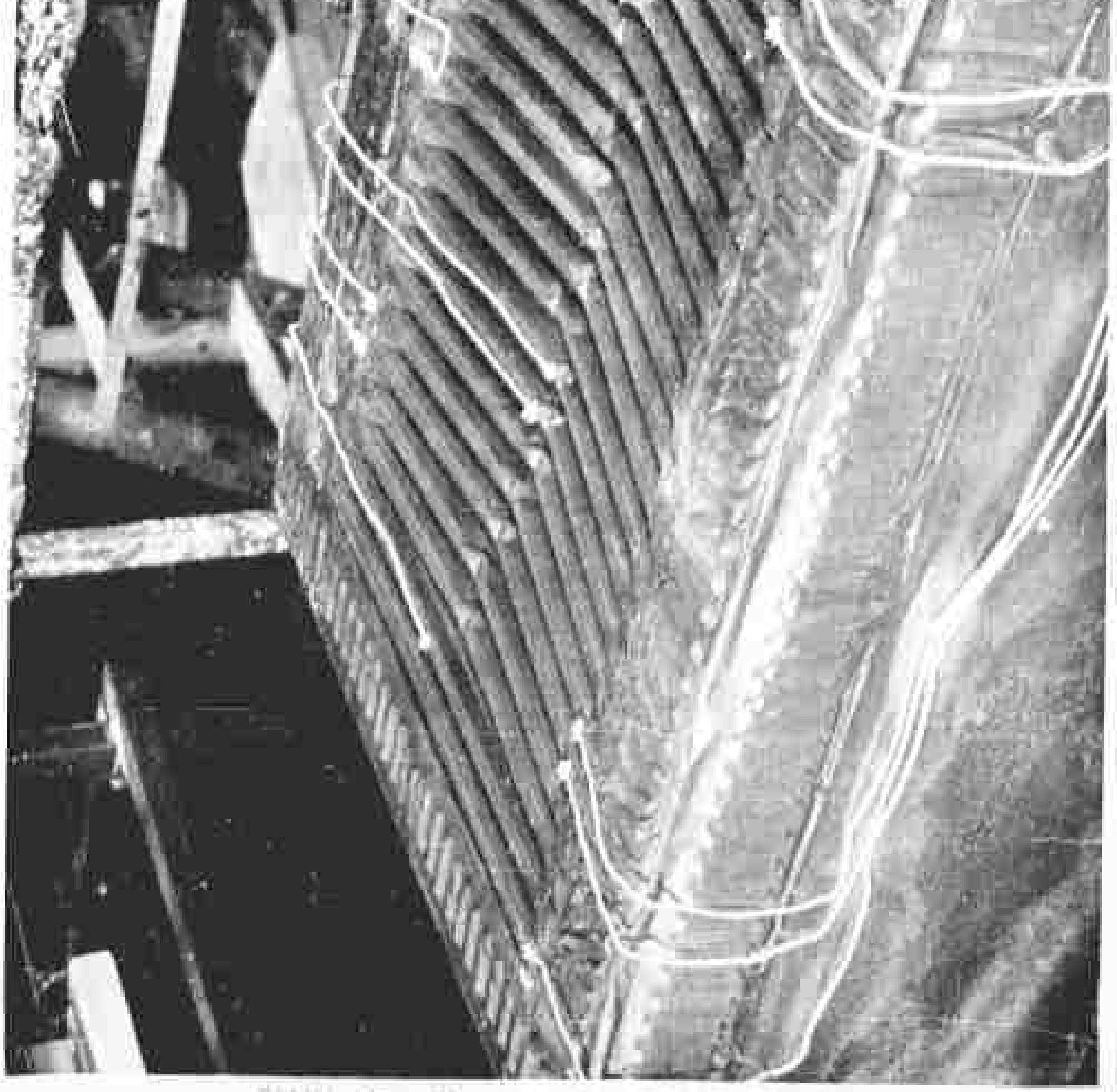
PANEL 25-20369-2 (1498) AFTER 5 MINUTE SONIC TEST AND HEAT TEST (BOTTOM VIEW)

DS-I INSULATION PANEL AFTER HEAT AND SONIC TEST 2A827C8
PANEL 1499 EWA 5-593 7-5-61

PANEL 25-20369-2 1499 AFTER 5 MINUTE SONIC
TEST AND HEAT TEST TOP VIEW

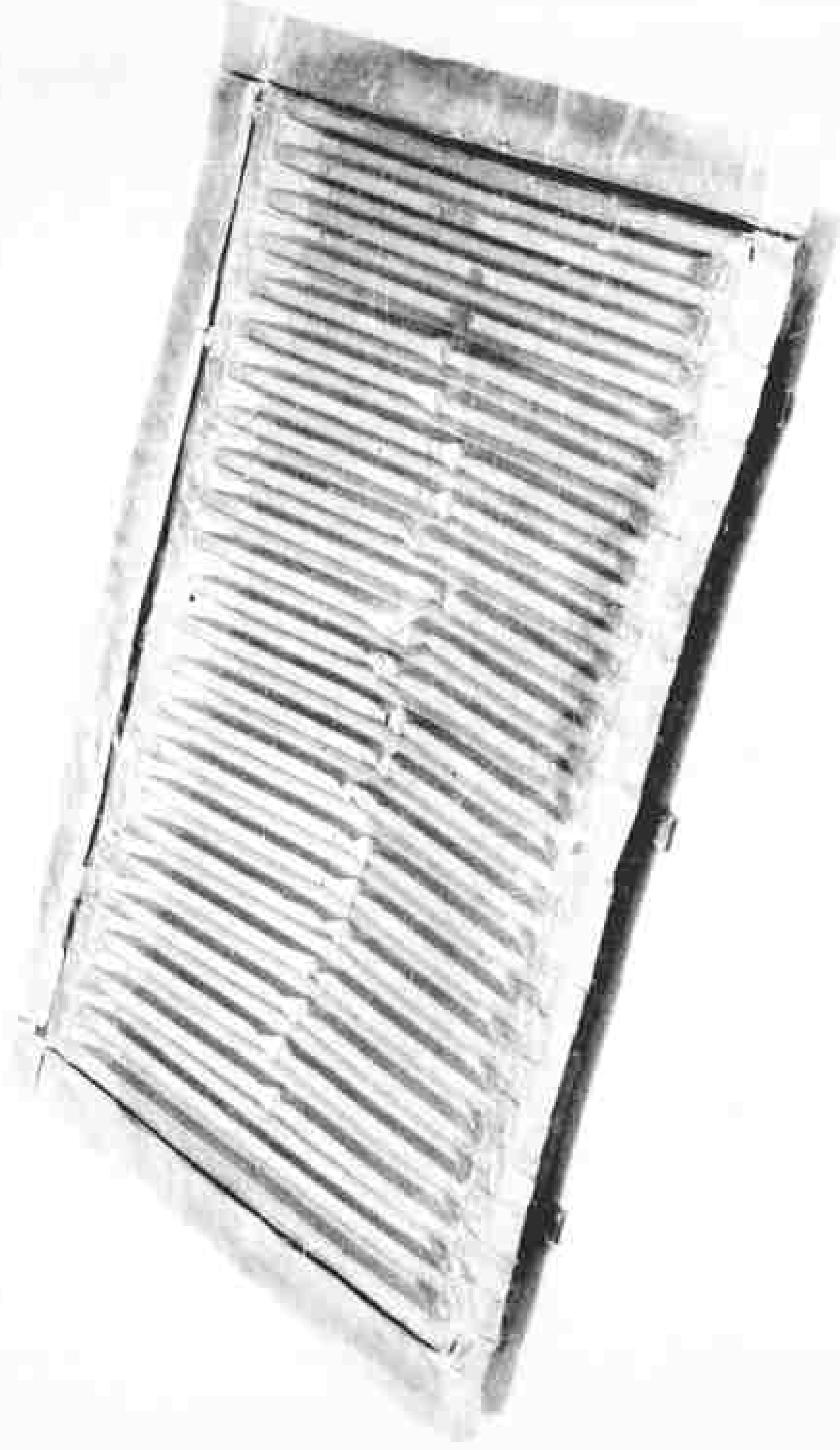
DS-I INSULATION PANEL AFTER HEAT AND SONIC TEST
PANEL 1499 EWA 5-593 7-3-61





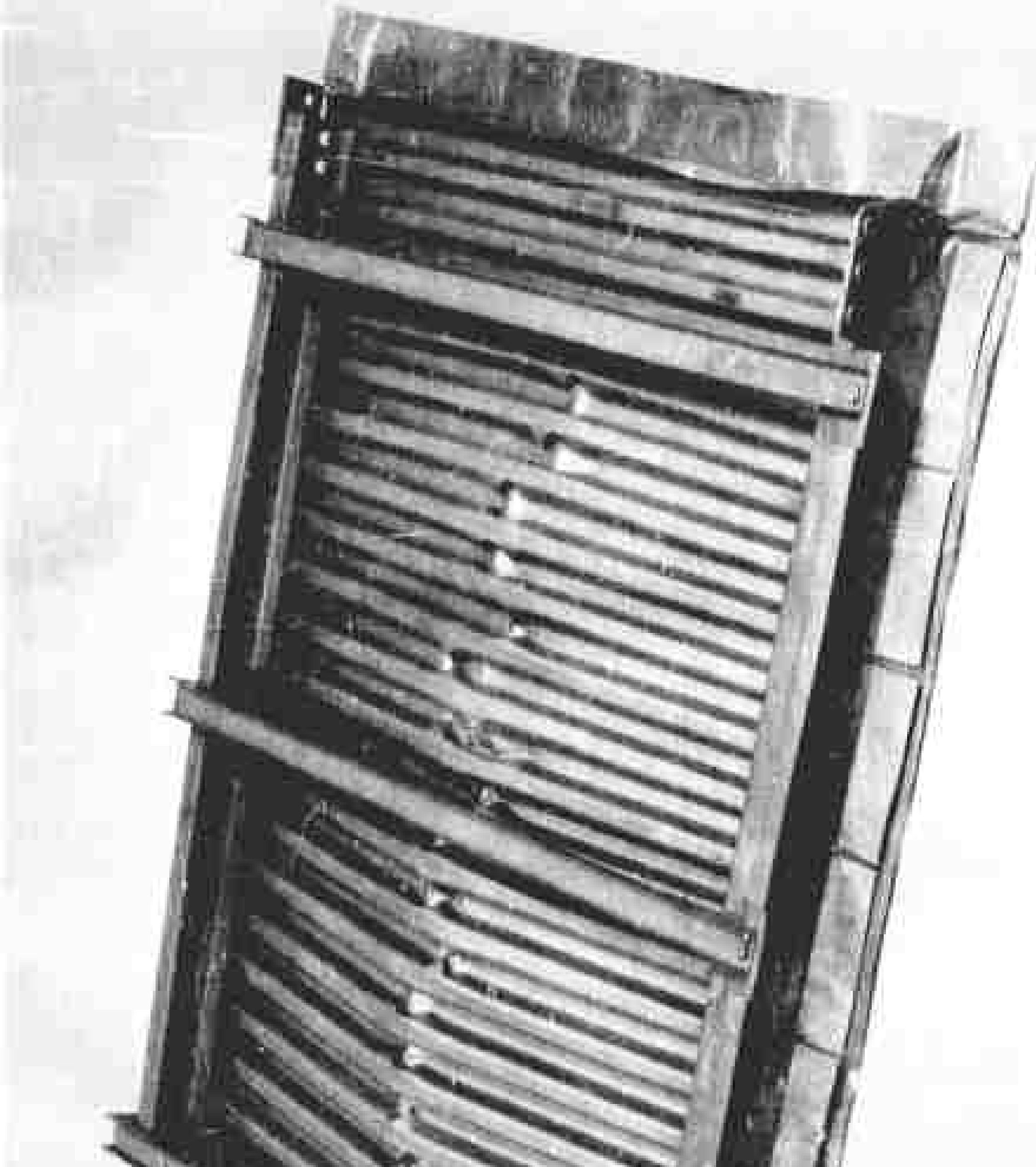
COL. D-18 BLDG 9.101 D.C. - DS-I PANEL 25-20374-2 2A94228
PRESSURE TEST FAILURE 12-8-61

U3-4071-1000 (was BAC 1546-L-R3)



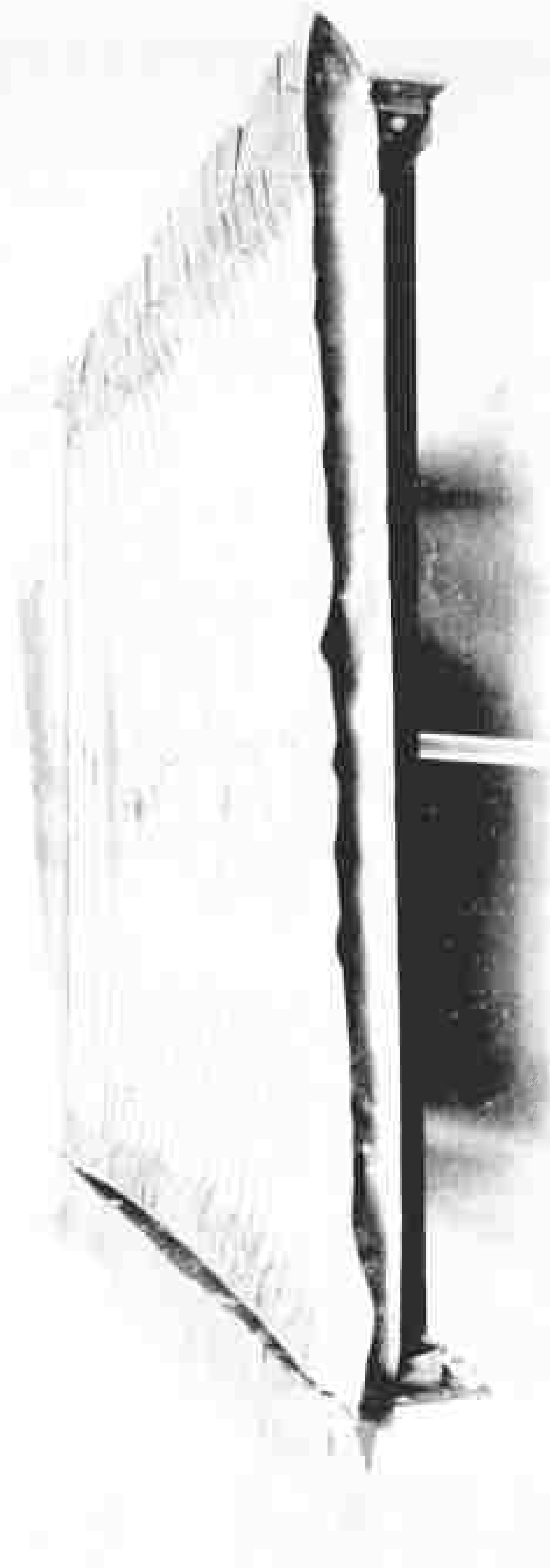
DYNASOAR WING PANEL FAILURE TOP VIEW 2A94984
12-20-61

U3-4071-1000 (was BAC 1546-L-R3)



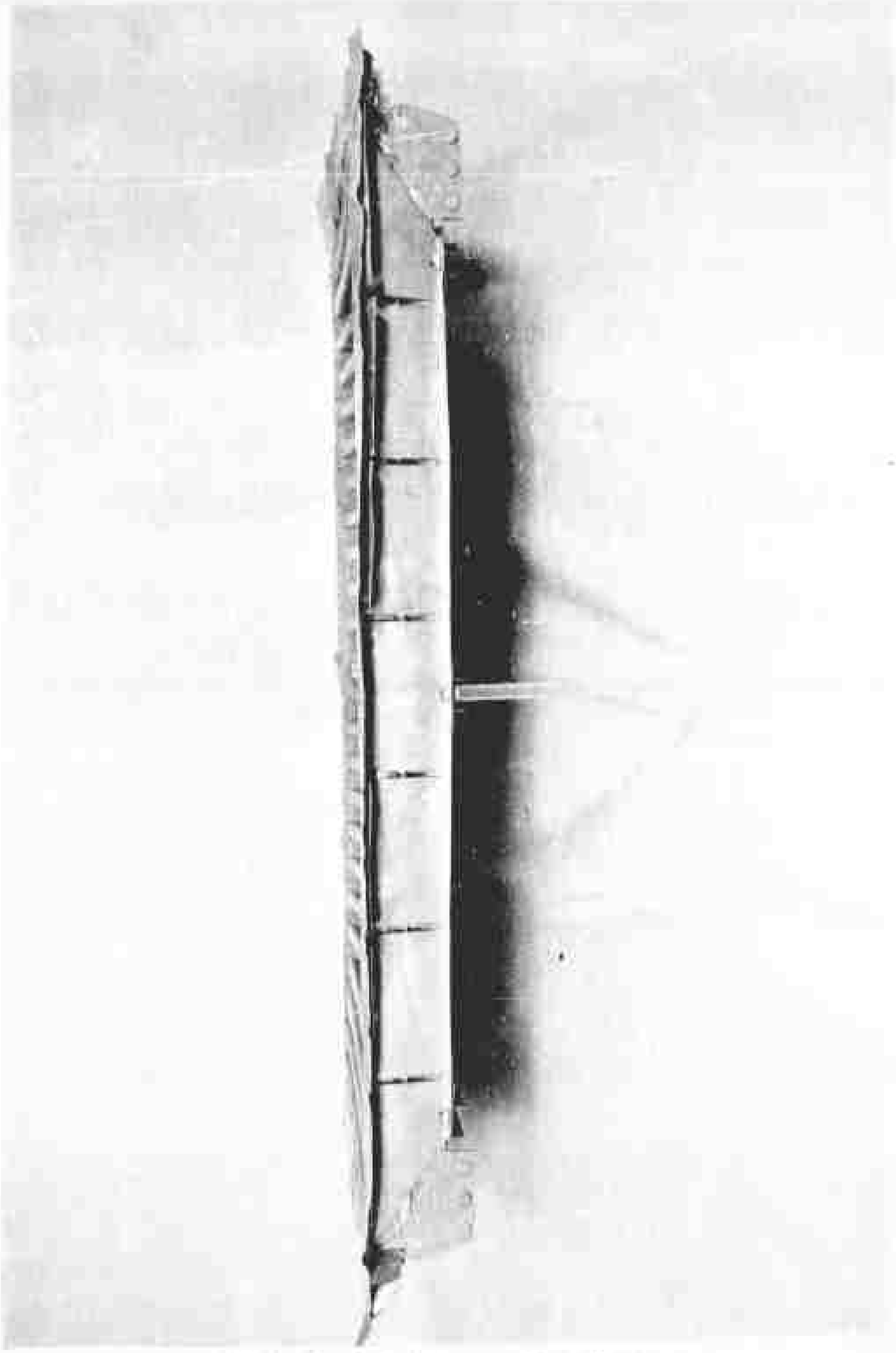
DYNASOAR WING PANEL FAILURE 25-20374-2 2A94985
BOTTOM VIEW 12-20-61

U3-4071-1000 (was BAC 1546-L-R3)

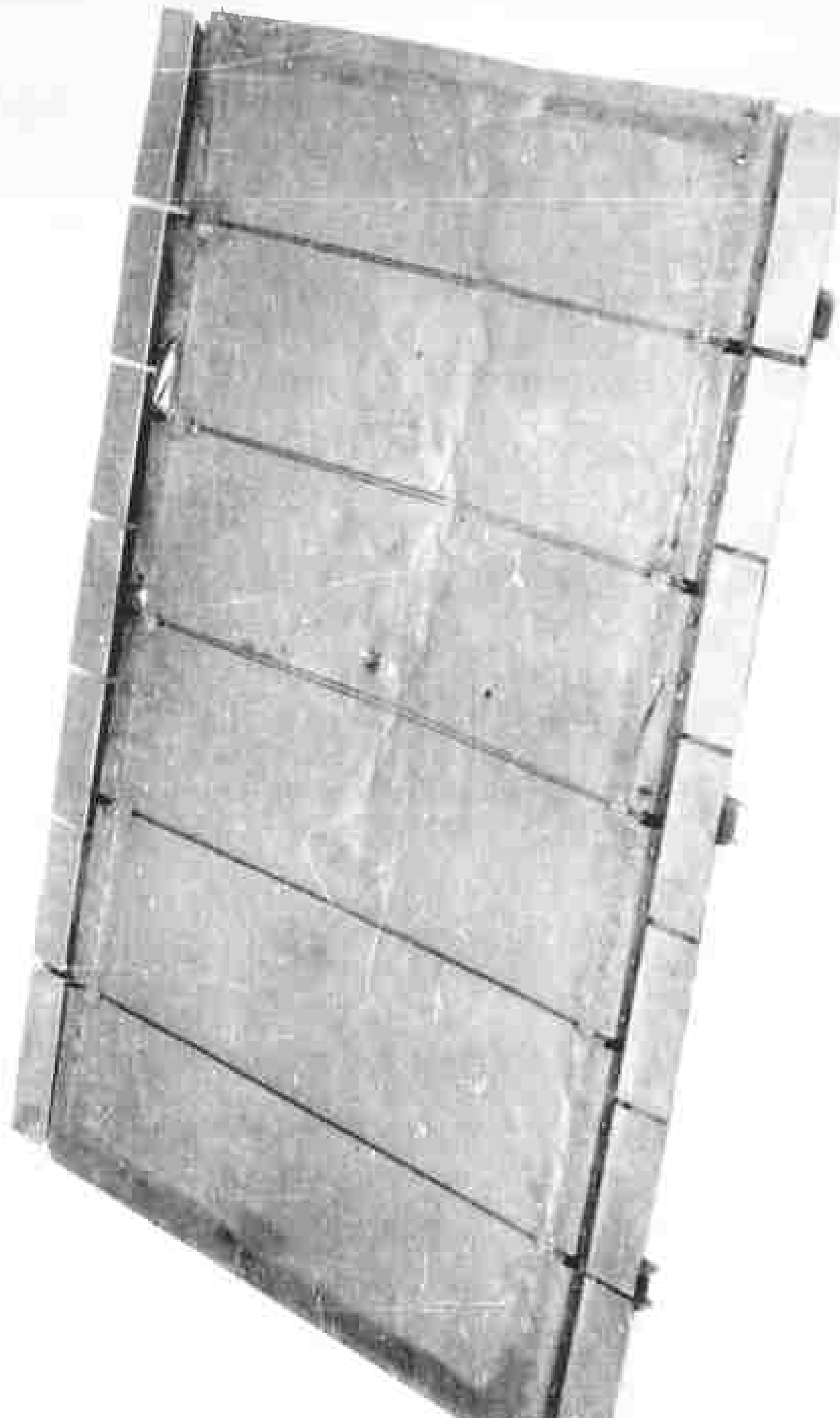


DYNASOAR WING PANEL FAILURE END VIEW 2A94987
12-20-61

U3-4071-1000 (was BAC 1546-L-R3)

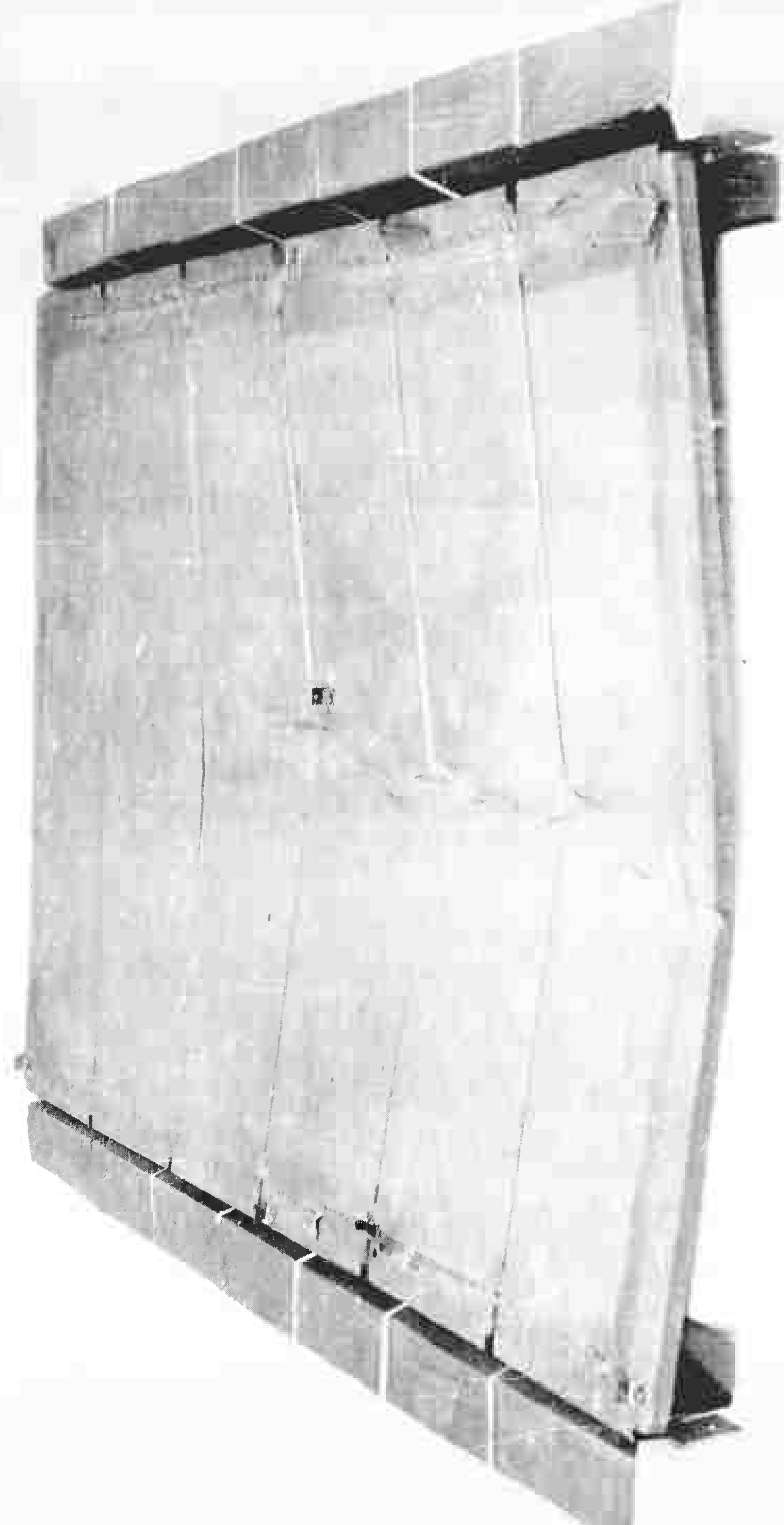


DYNASOAR WING PANEL FAILURE SIDE VIEW 2A94986
12-20-61



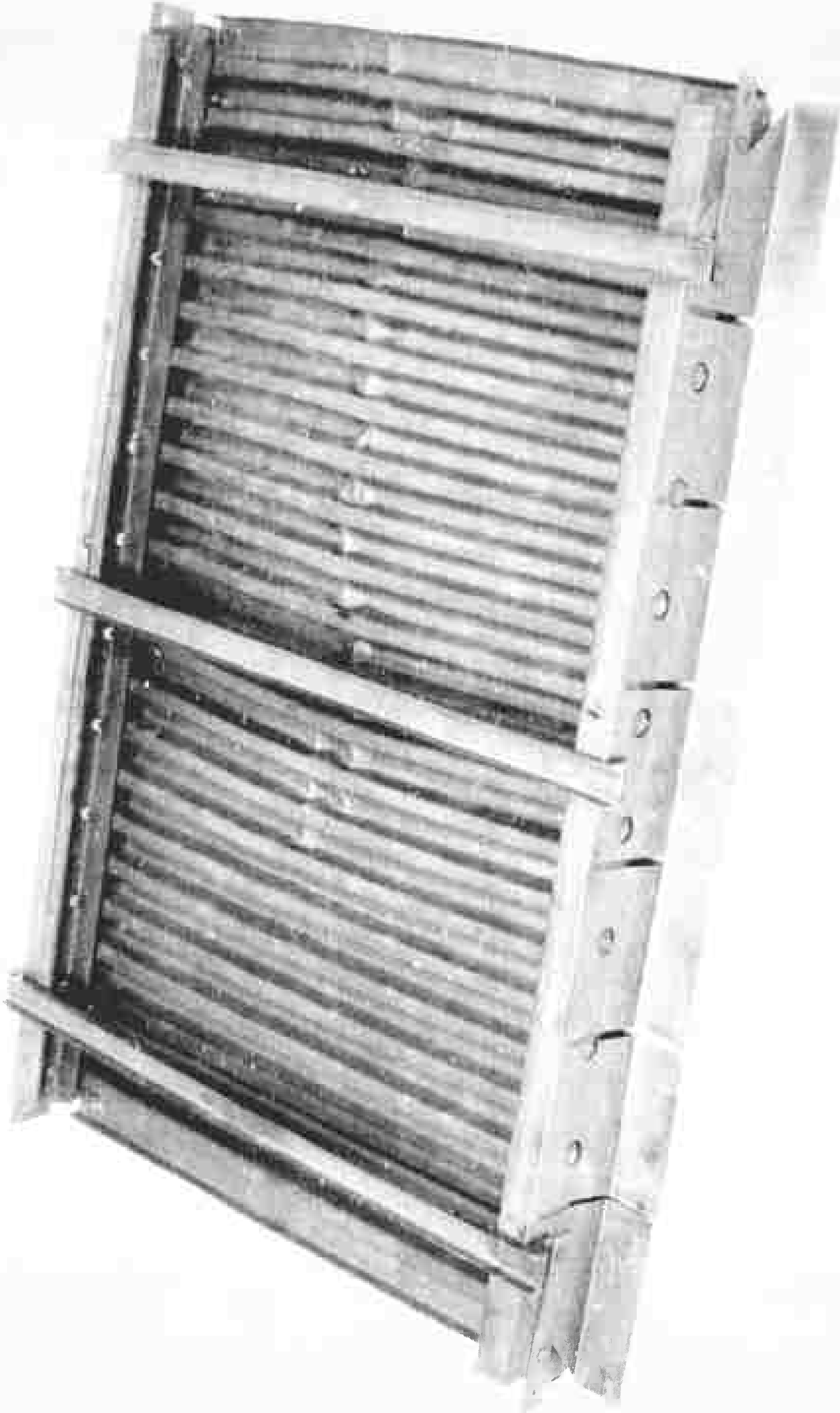
DS-1 WING PANEL FAILURE - TOP VIEW 1-3-62

2A95304



... LT-5590-4-...

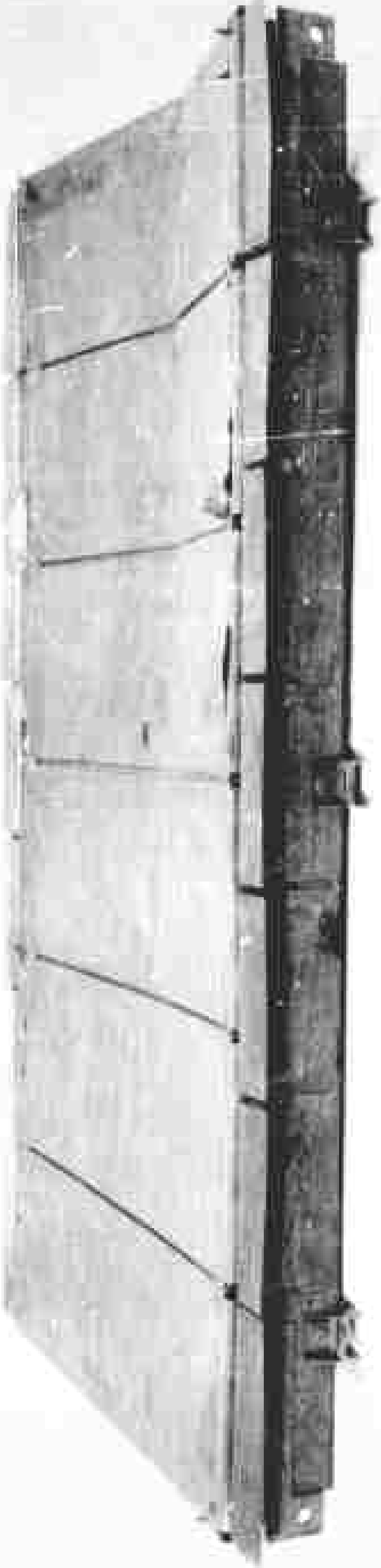
WING PANEL FAILURE - END VIEW 1-3-62 2A95395



DSI - WING PANEL FAILURE - BOTTOM VIEW
1-3-62
2A95393

DSI - WING PANEL FAILURE - SIDE VIEW
1-3-62

2A95342

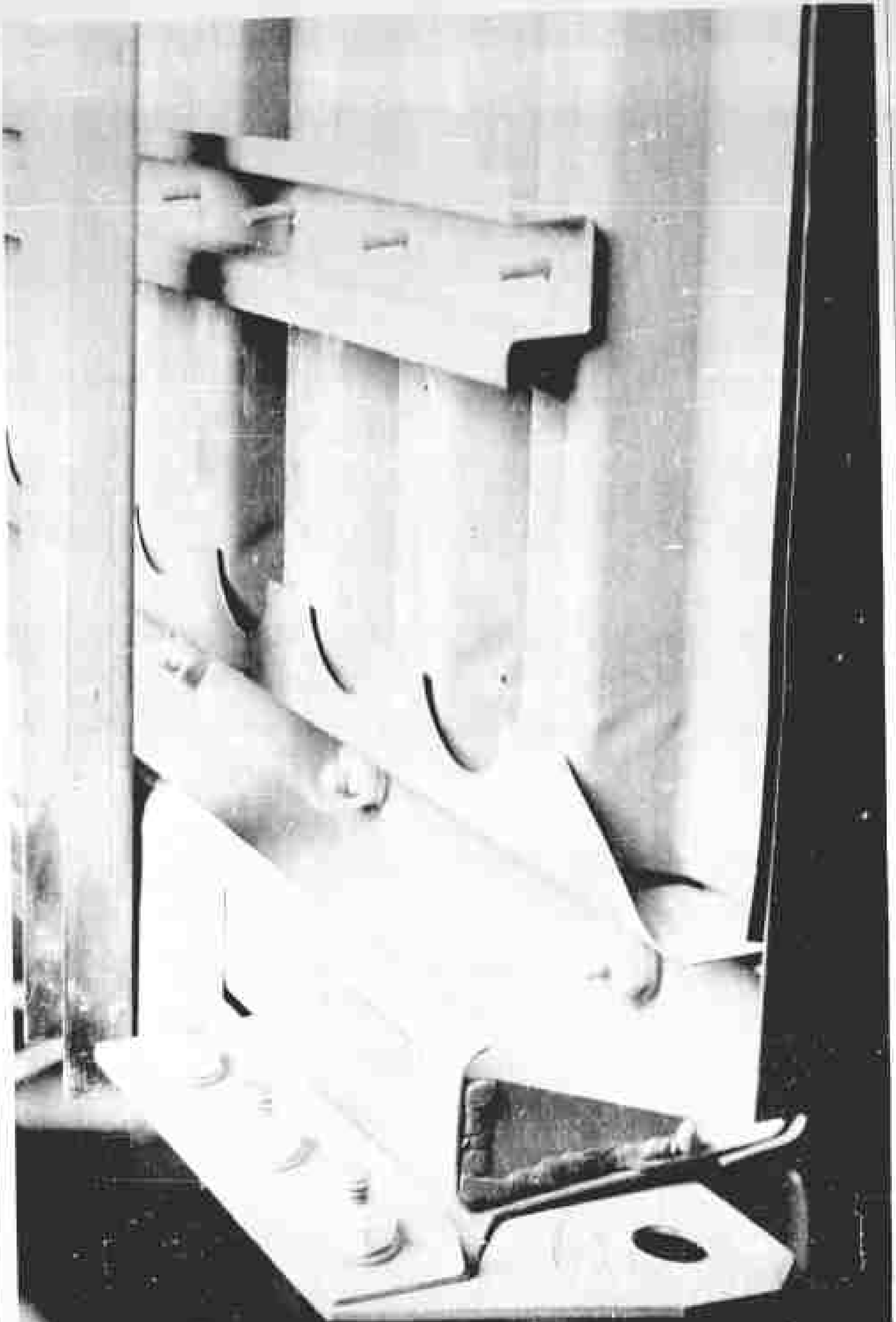


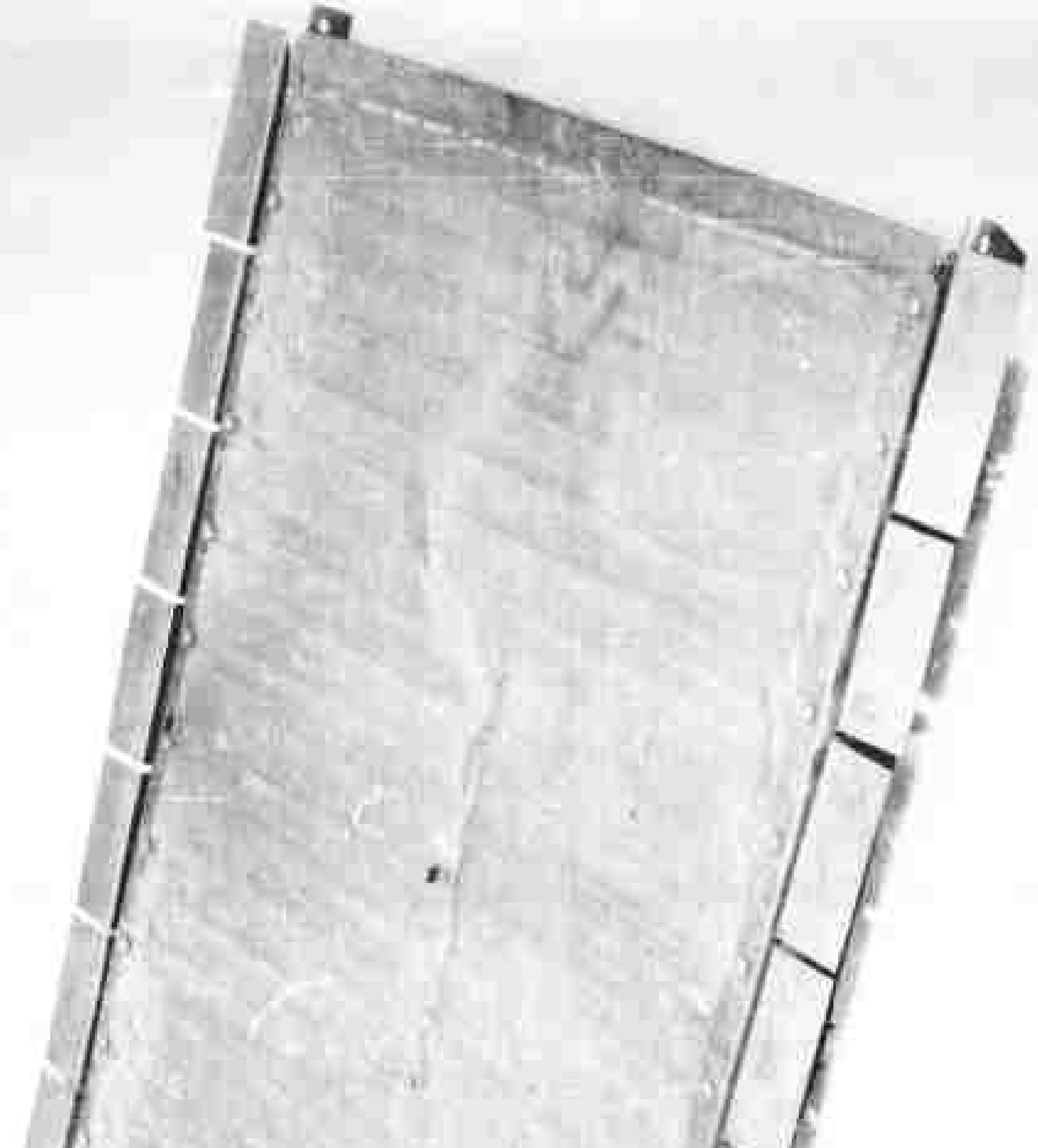
U3-4071-1000 (was BAC 1546-L-R3)

3-I WING PANEL FAILURE PANEL #25-20370-2
OP VIEW SHOWING WRINKLES
1-5-62
2A95074

2495576

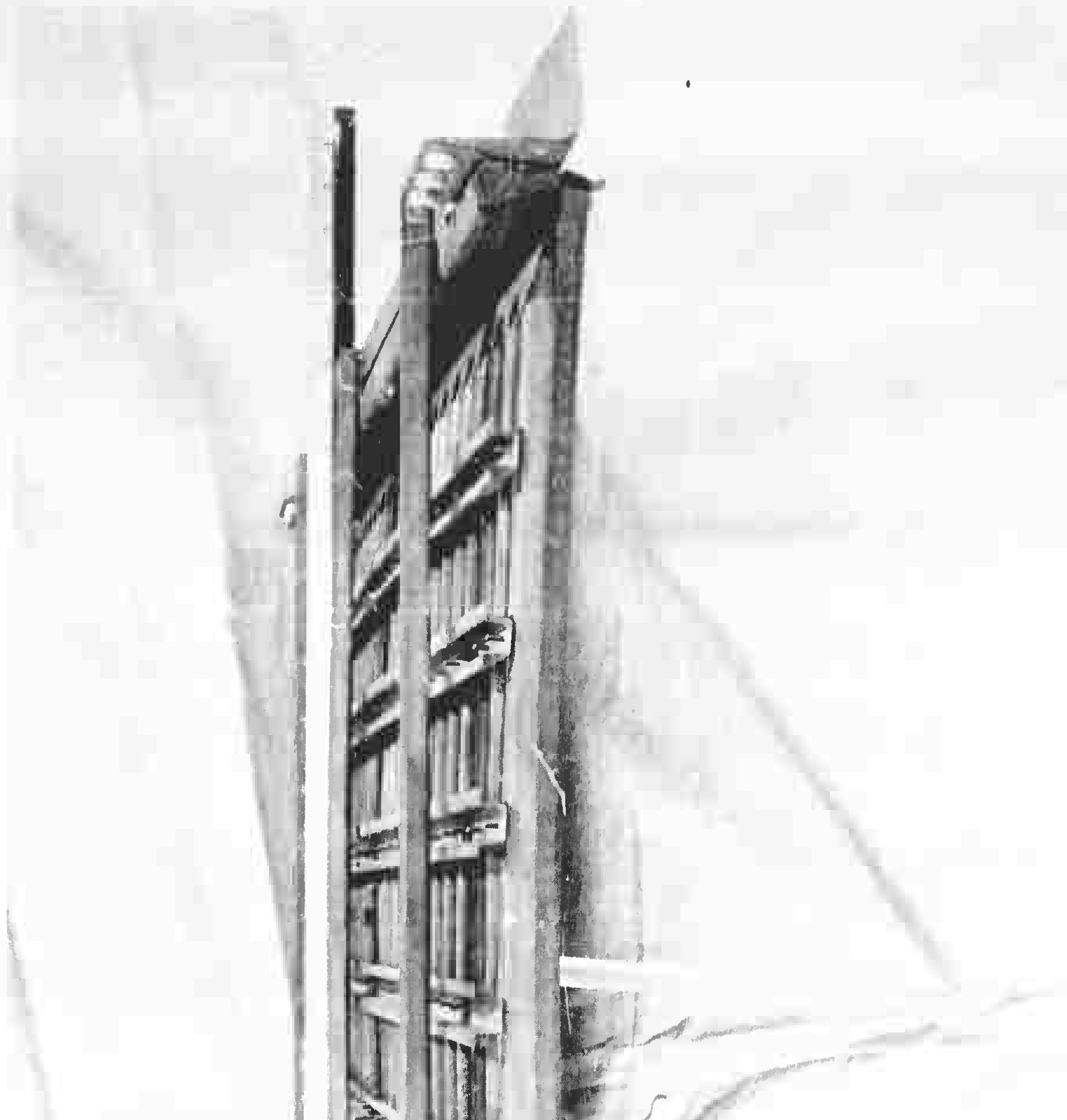
DS-I WING PANEL FAILURE PANEL
SHOWING #25-20370-2 SHOWING WRINKLES
ON CORNER 1-5-62



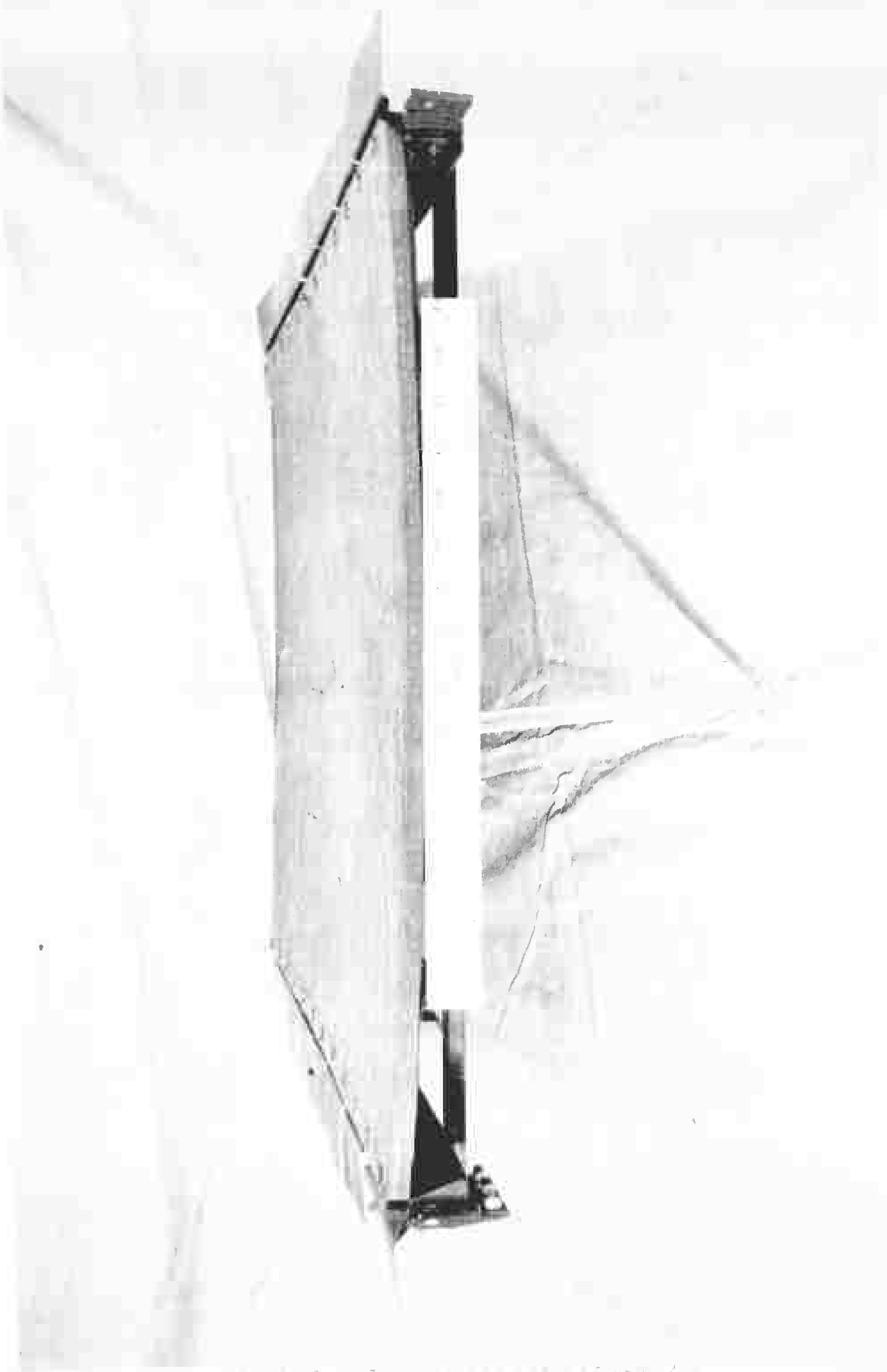


2A96116

DS-I - WING PANEL FAILURE
PANEL 25-20352 - TOP VIEW 1-15-62



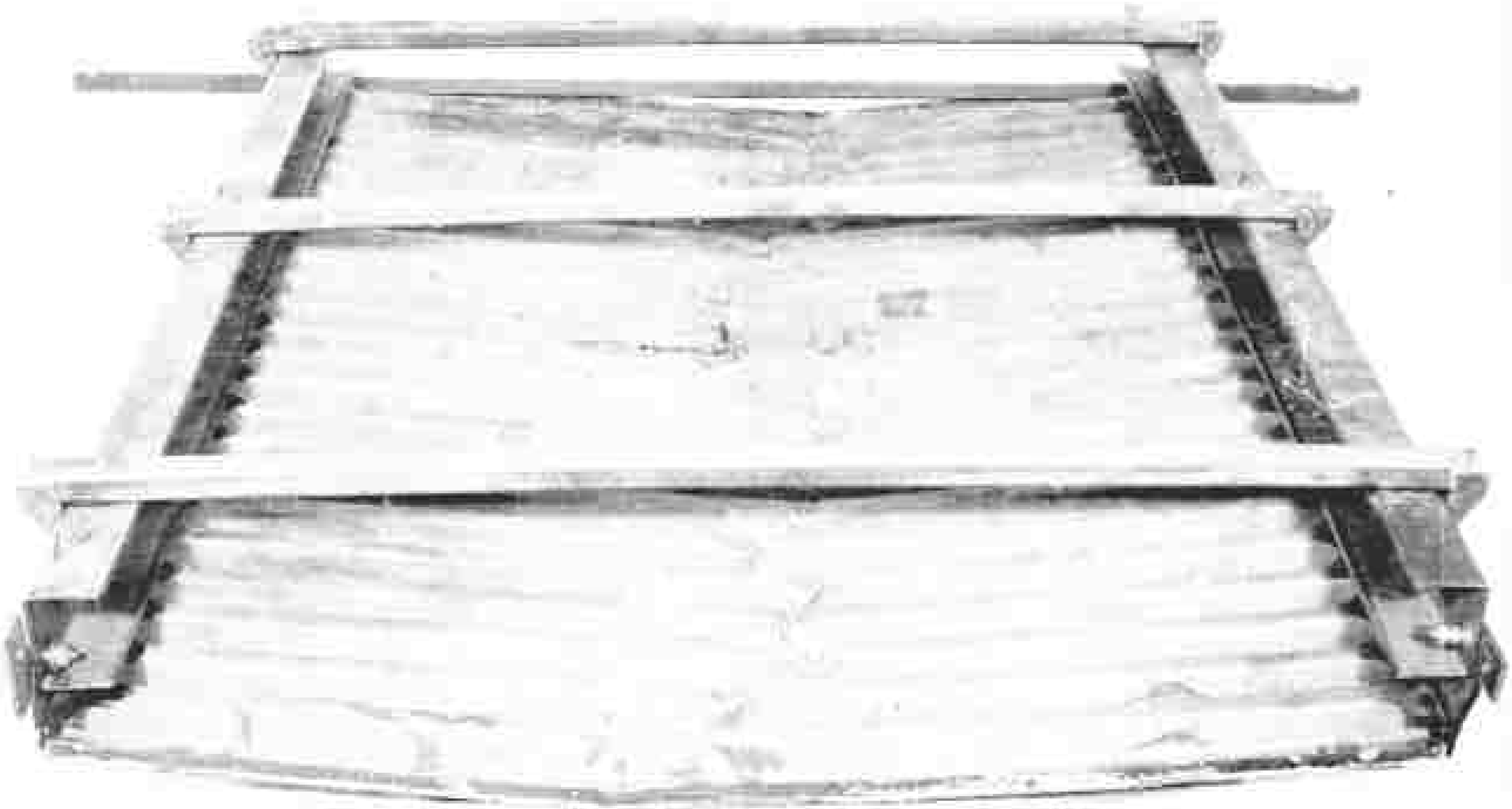
DS-I - WING PANEL FAILURE
PANEL 25-20352- END VIEW 1-15-62 2A96117

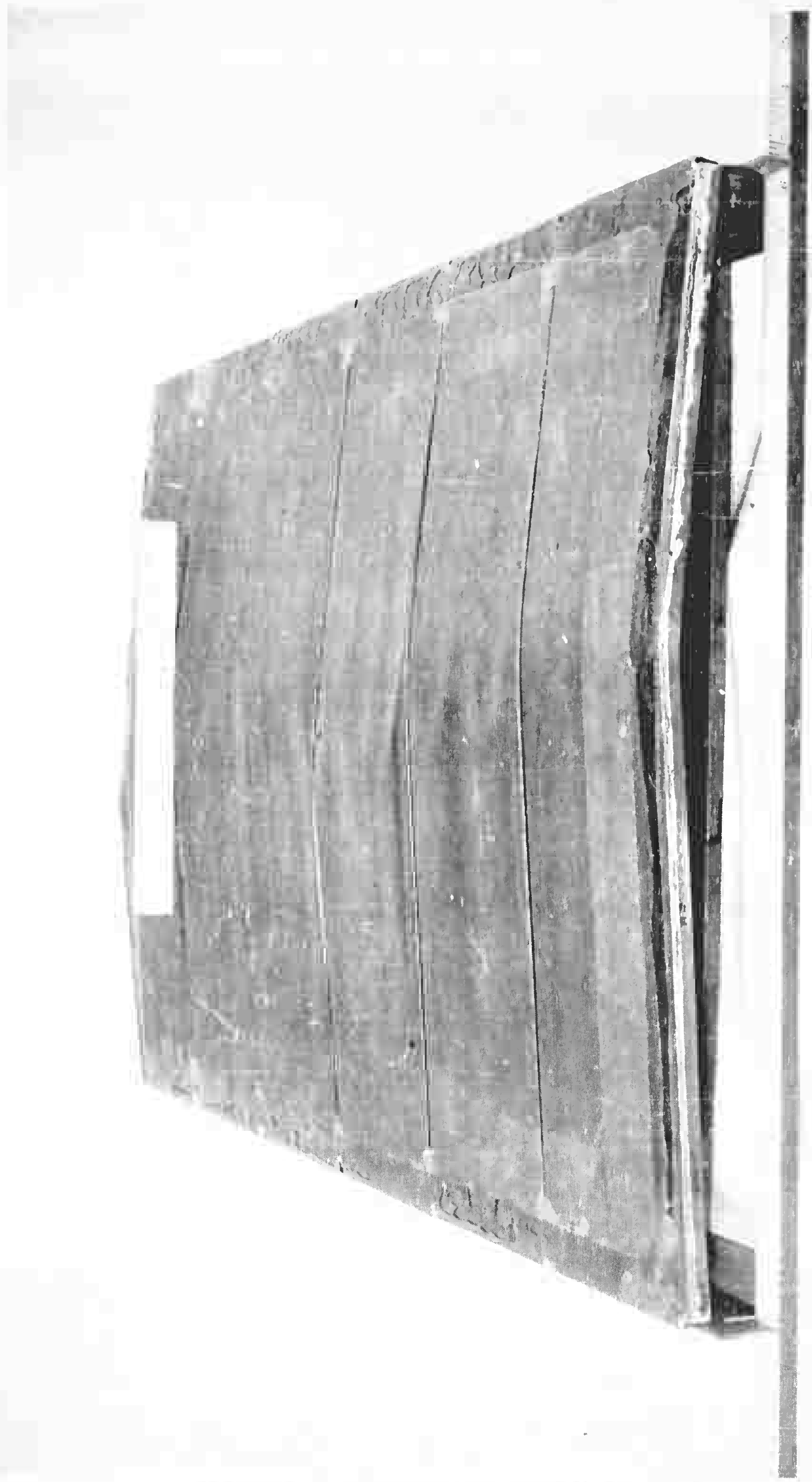


DS-I - WING PANEL FAILURE
PANEL 25-20352 - END TOP VIEW 1-15-62

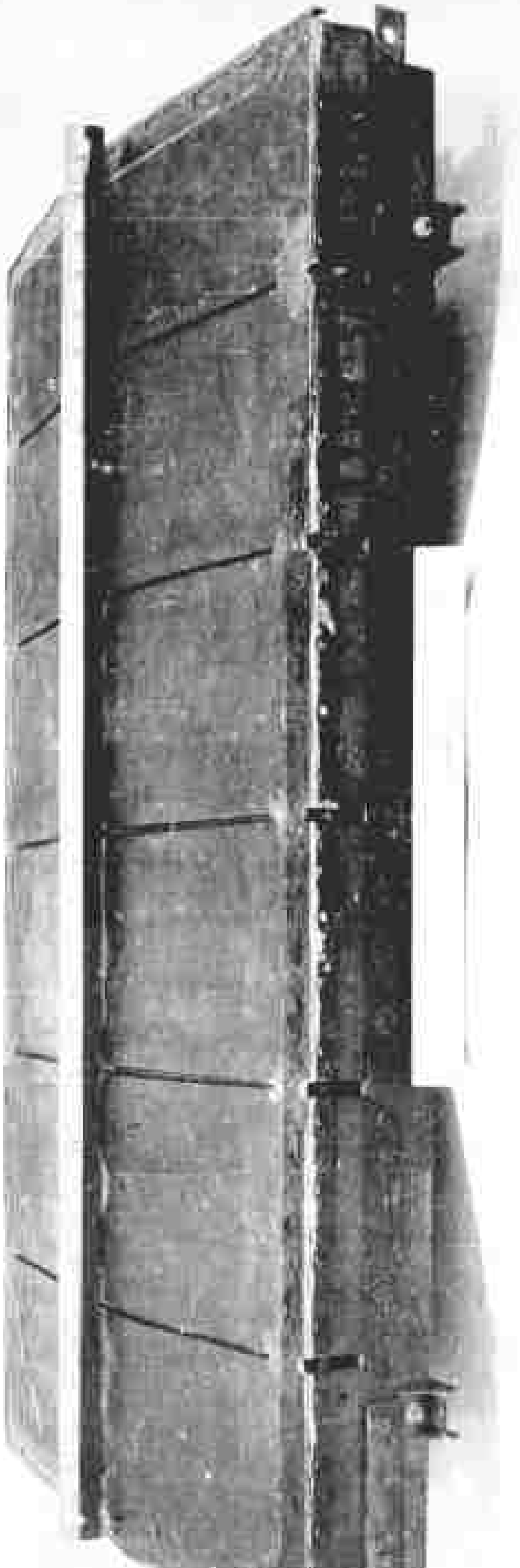
2A96118

DS-I PANEL 25-20352 R.T. AFTER PRESSURE TEST 2A102020
BOTTOM END VIEW - 3-6-62



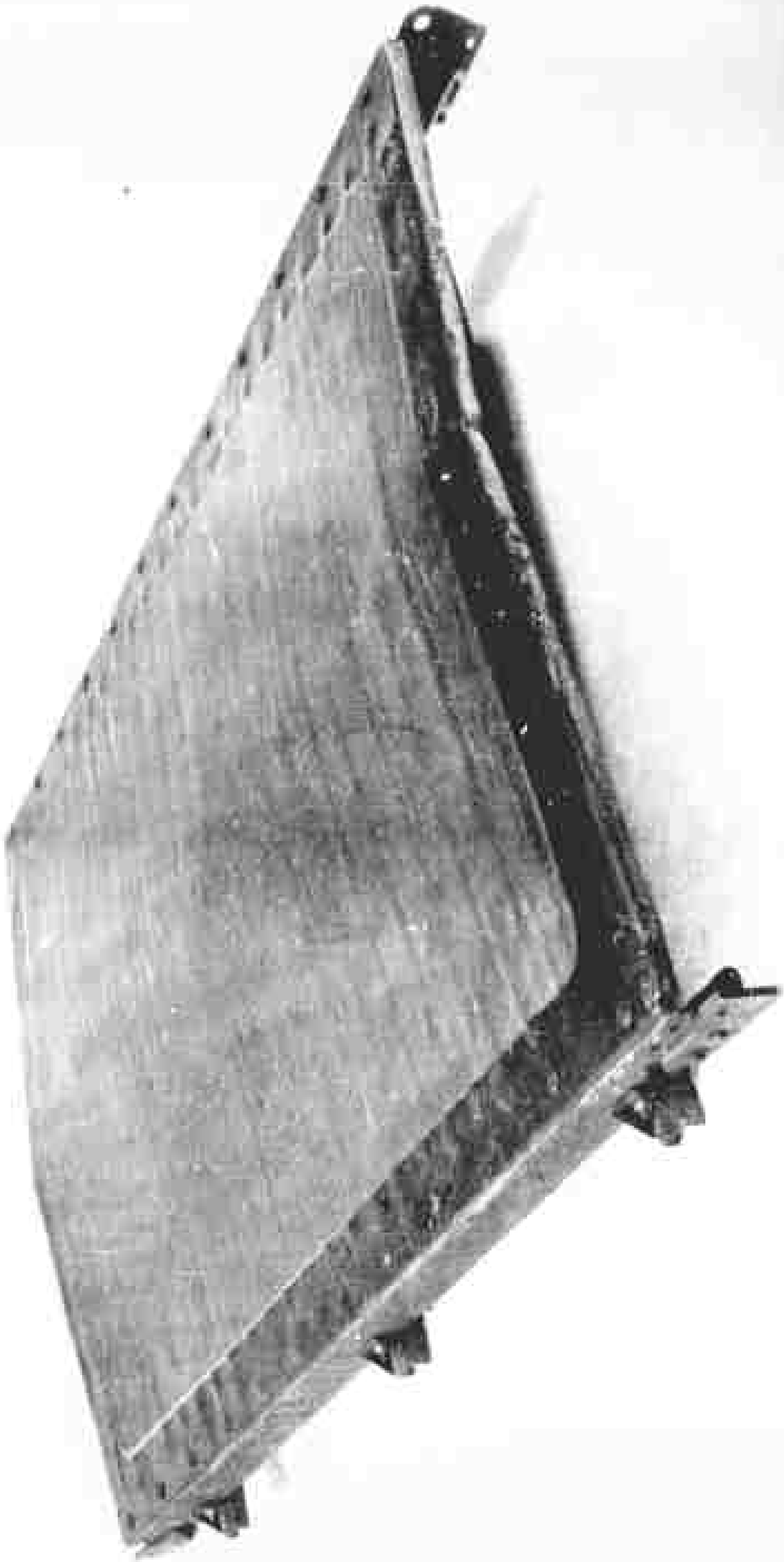


DS-I PANEL 25-20352 R.T. AFTER PRESSURE TEST 2A102624
TOP END VIEW - 3-6-62



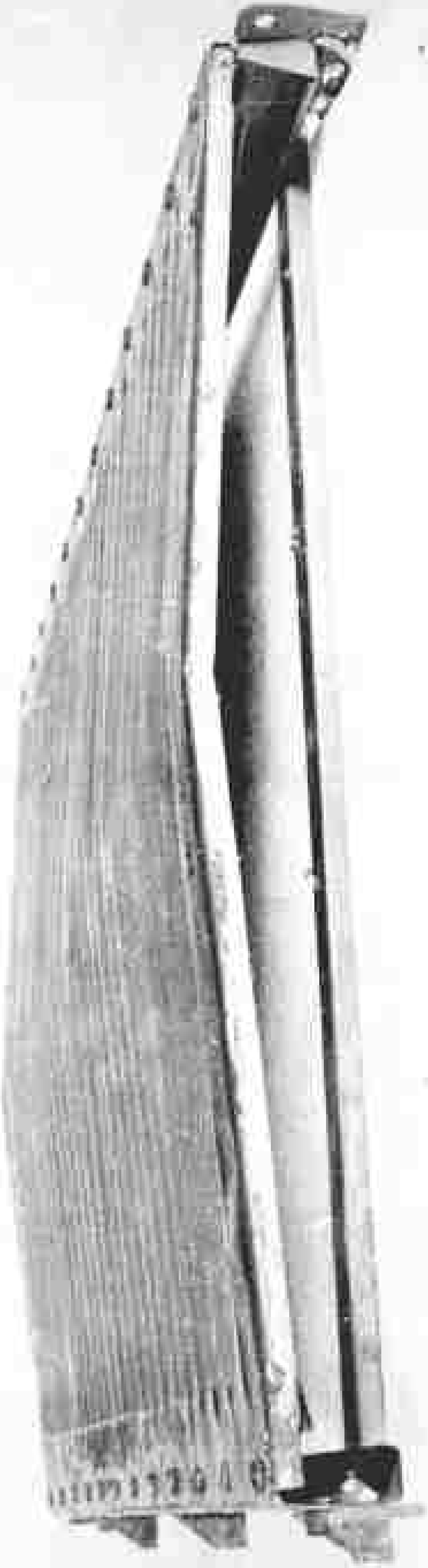
DS-I PANEL 25-20352 R.T. AFTER PRESSURE TEST 2A102623
TOP VIEW - 3-6-62

[illegible] AFT [illegible] LT-55[illegible]-4-5



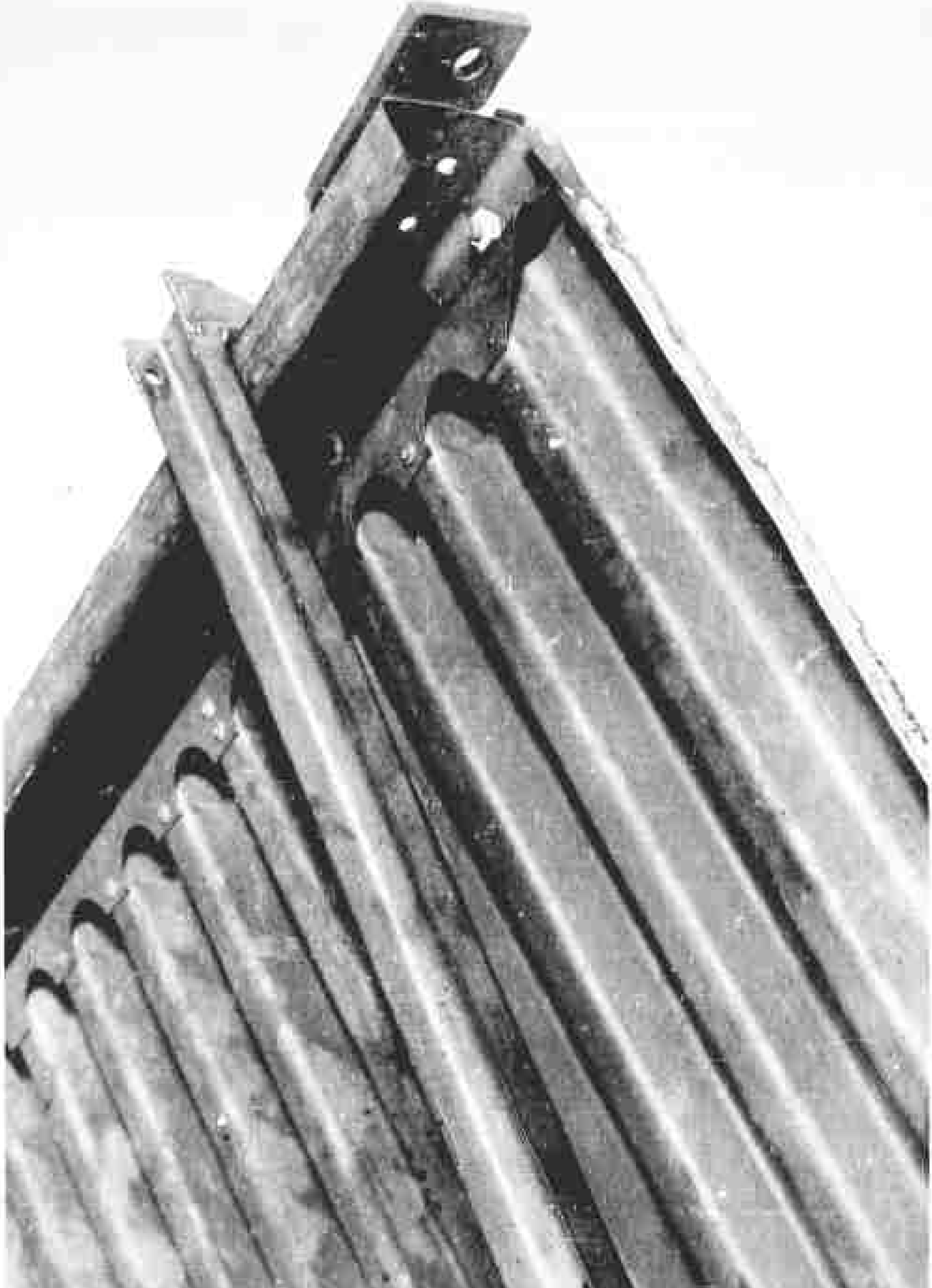
DS-I WING PANEL # ... FAILURES

U3-4071 1000 (was BAC 1546-L-R3)

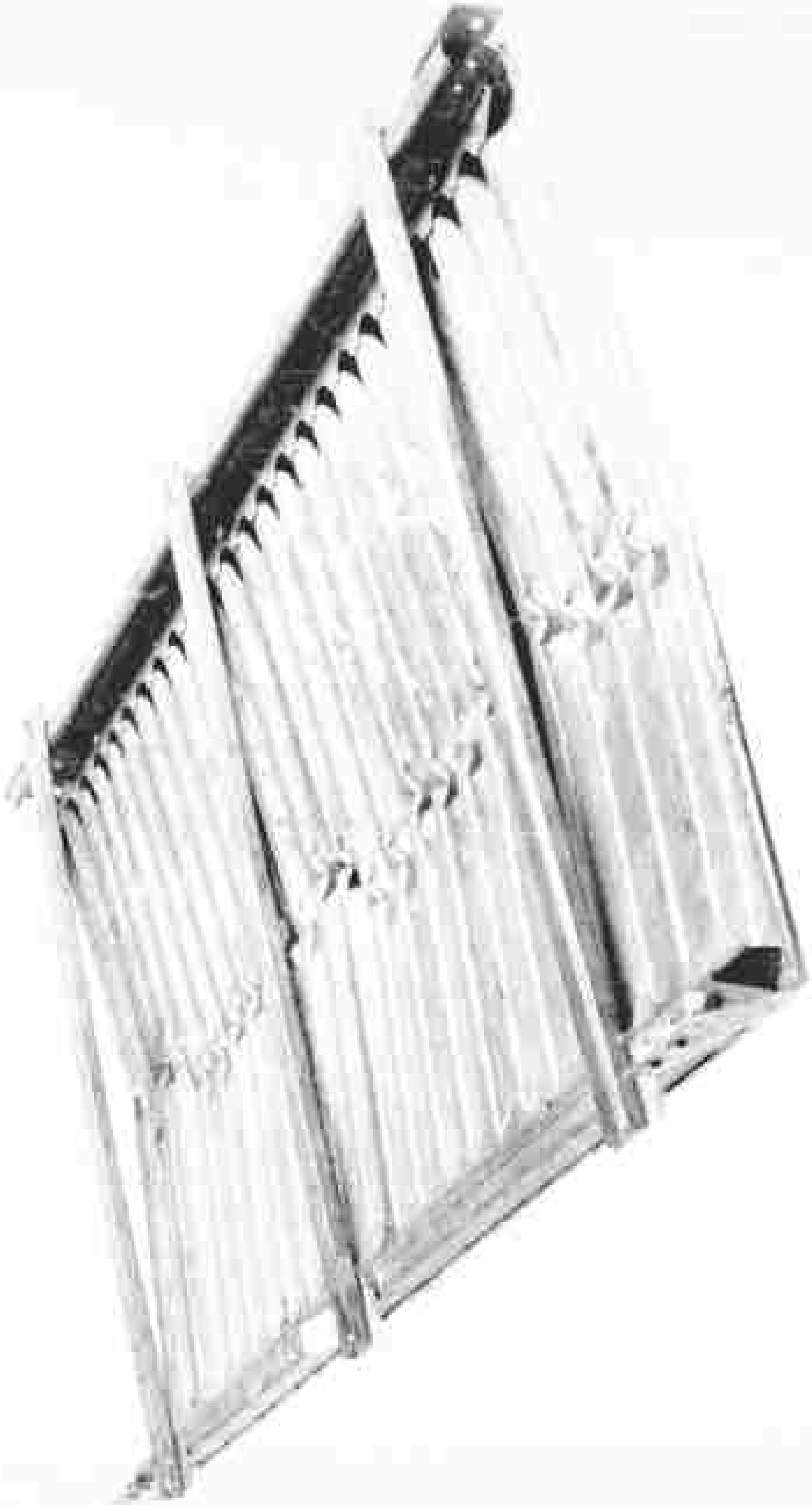


DS-I WING PANEL #25-203[illegible] - PRESSURE TEST FAILURES 3-2[illegible] LA204149

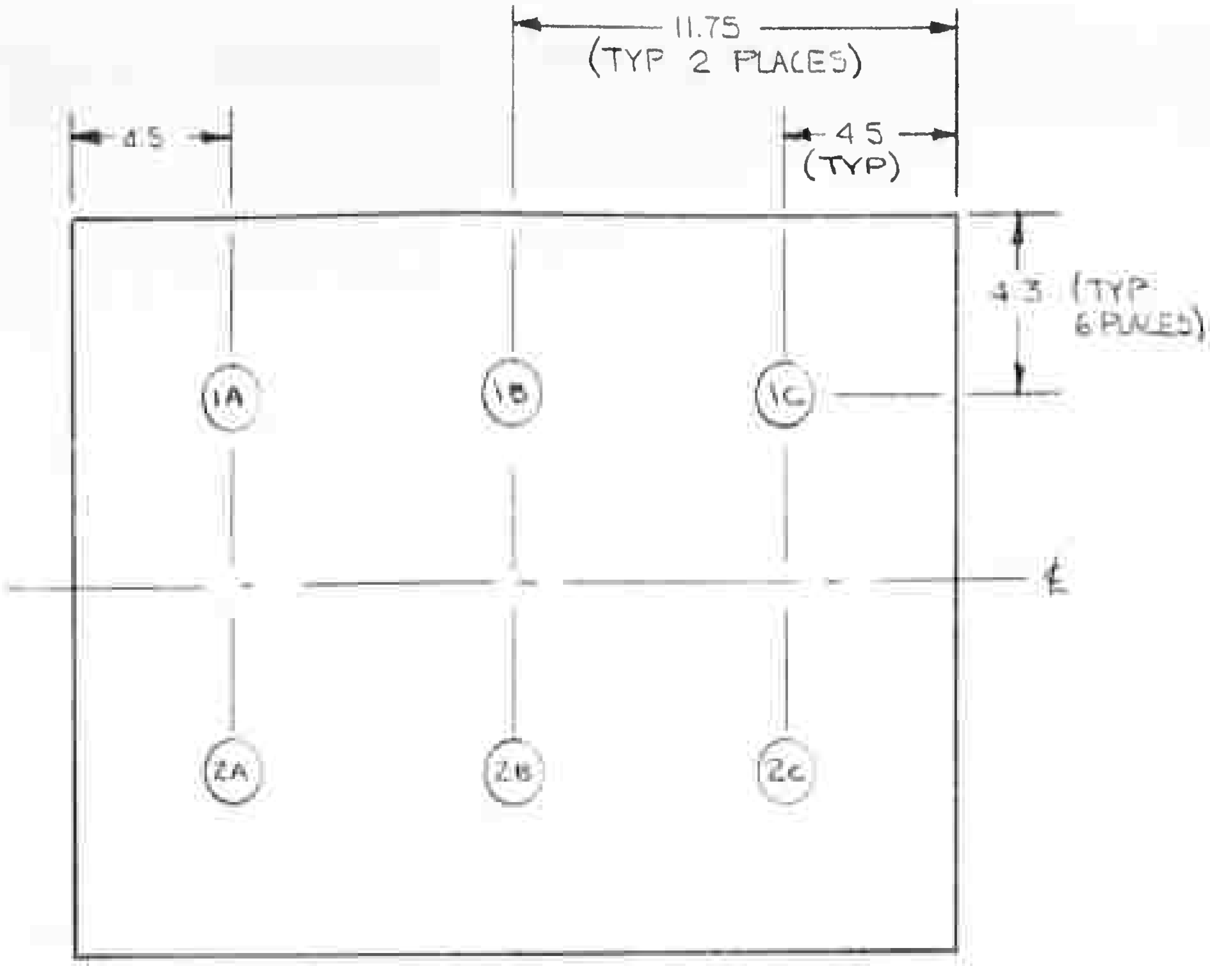
DS-I WING PANEL #25-20370 - PRESSURE TEST 2A104150
FAILURES 3-12-62



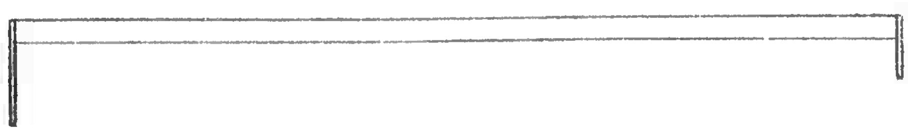
[illegible]ANEL 25-[illegible]-1 [illegible] REF. LT-5593-4-5



DS-I WING PANEL #25-20370 - PRESSURE TEST 2A104151
FAILURES 3-12-62

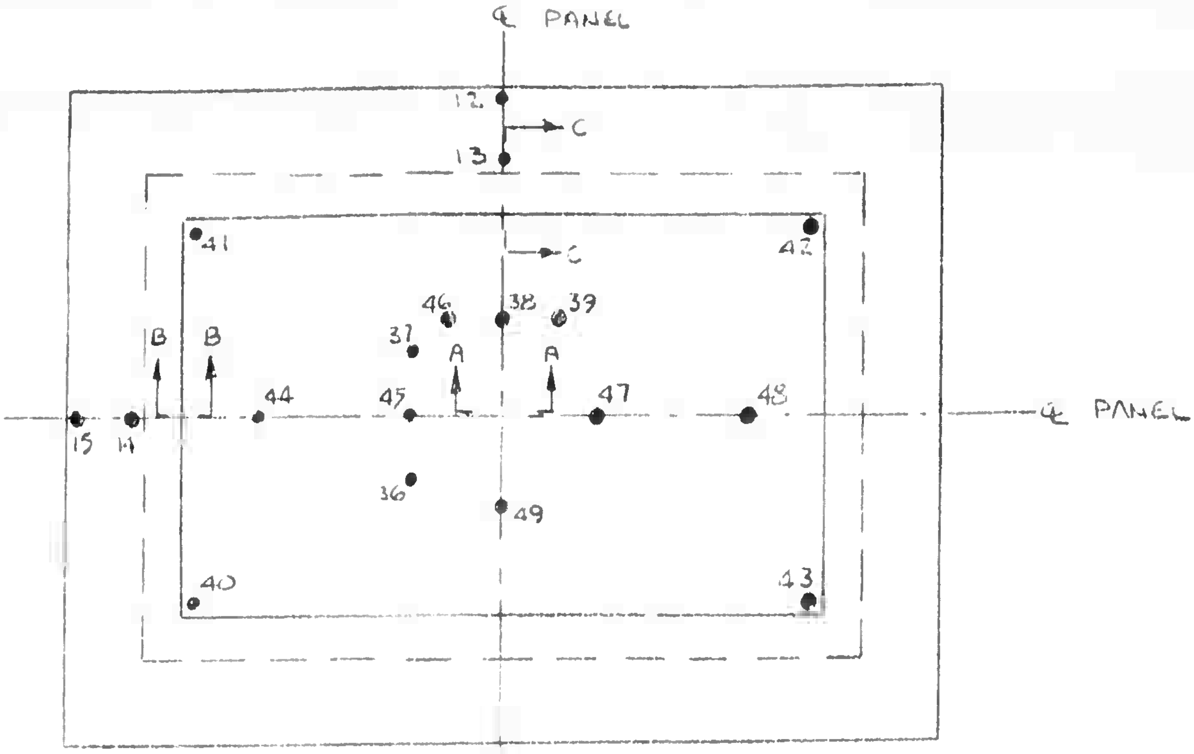


PANEL
(OUTSIDE SKIN SHOWN)

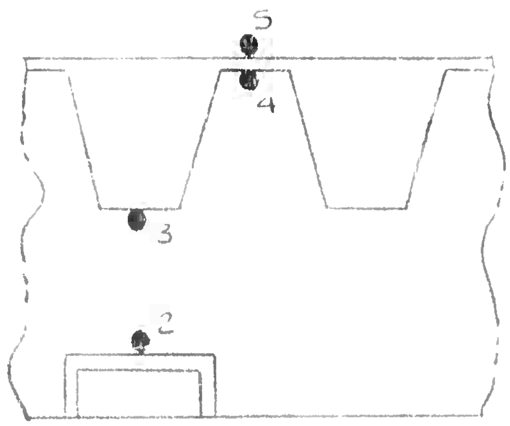


NOTE: ALL THERMOCOUPLES SHOWN ARE CONTROLS, AND ARE ATTACHED TO OUTSIDE SKIN ONLY.

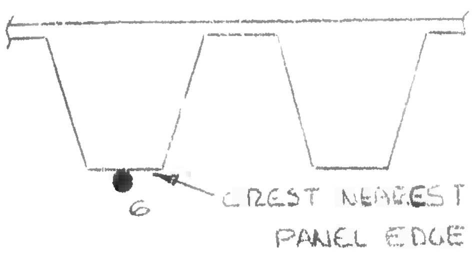
CALC Schmid 7-63	REVISED	DATE	CONTROL THERMOCOUPLE LOCATIONS	VOL I
CHECK			LT-5593-1	D2-80084
APPD				
APPD			BOEING AIRPLANE COMPANY	PAGE FIG 65



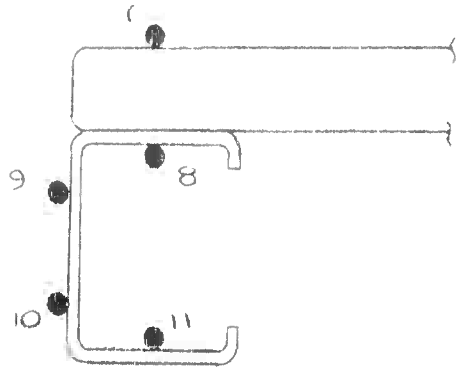
TEST PANEL 25-20374-1



VIEW A-A



VIEW B-B



VIEW C-C
ROTATED 90° COUNTERCLOCKWISE

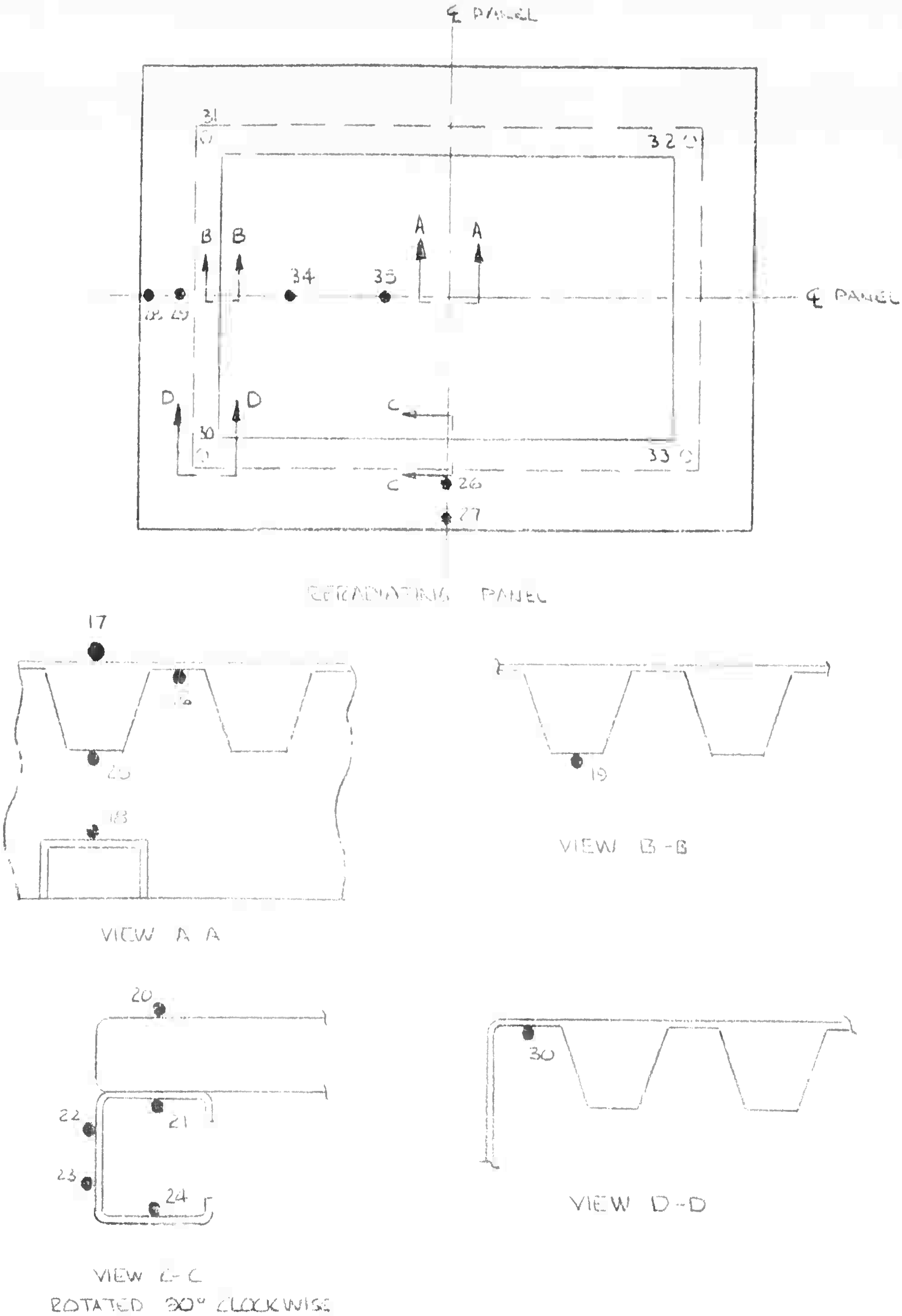
S.G... 7-63

THERMOCOUPLE LOCATIONS
TEST PANEL 25-20374-1
LT-5593-2-1

D2-30084

THE BOEING COMPANY

Fig



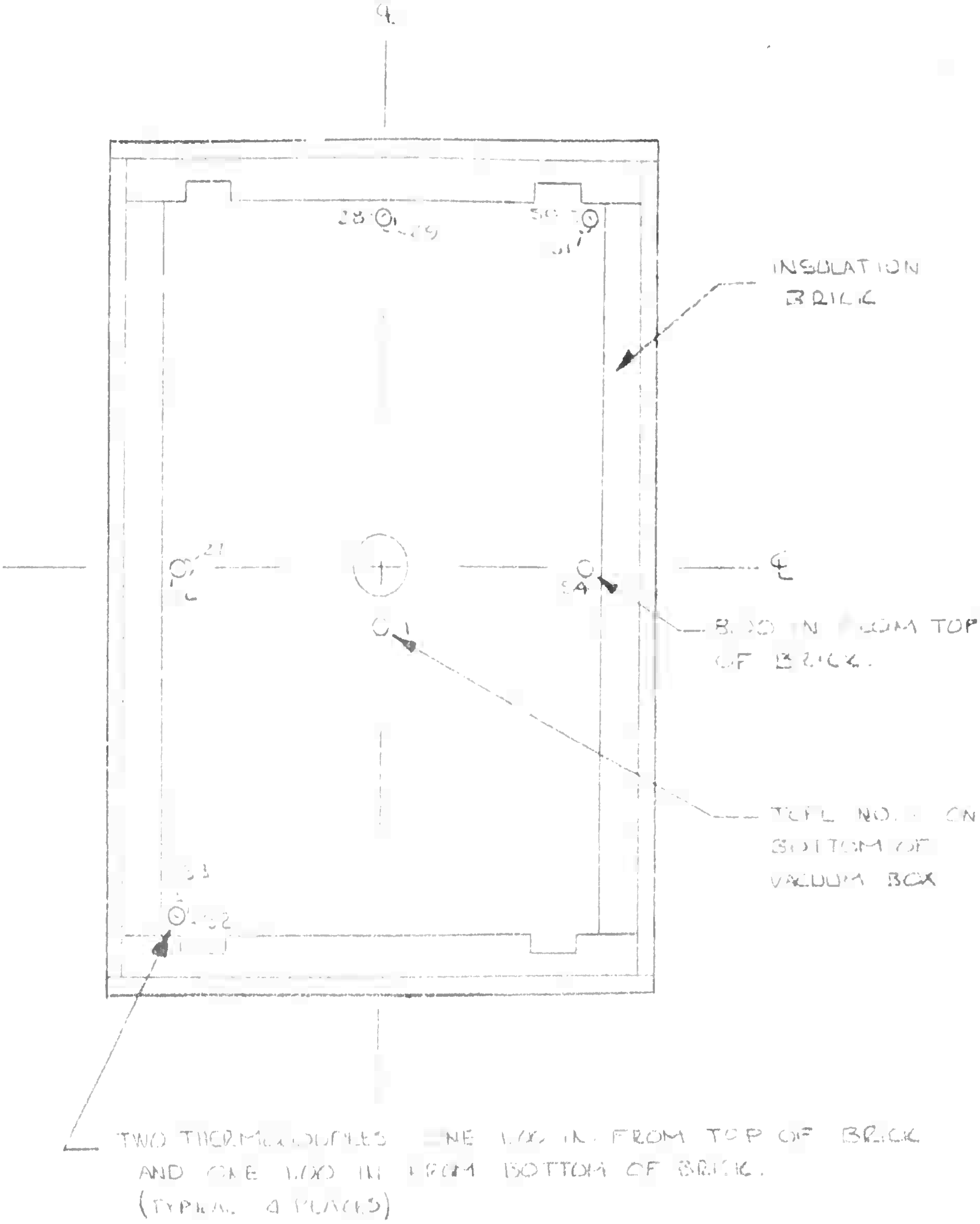
Schmeidler 7-63

THERMOCOUPLE LOCATIONS
RE-RADIATING PANEL
LT-5593-2-1

D2-80084

THE BOEING COMPANY

FIG

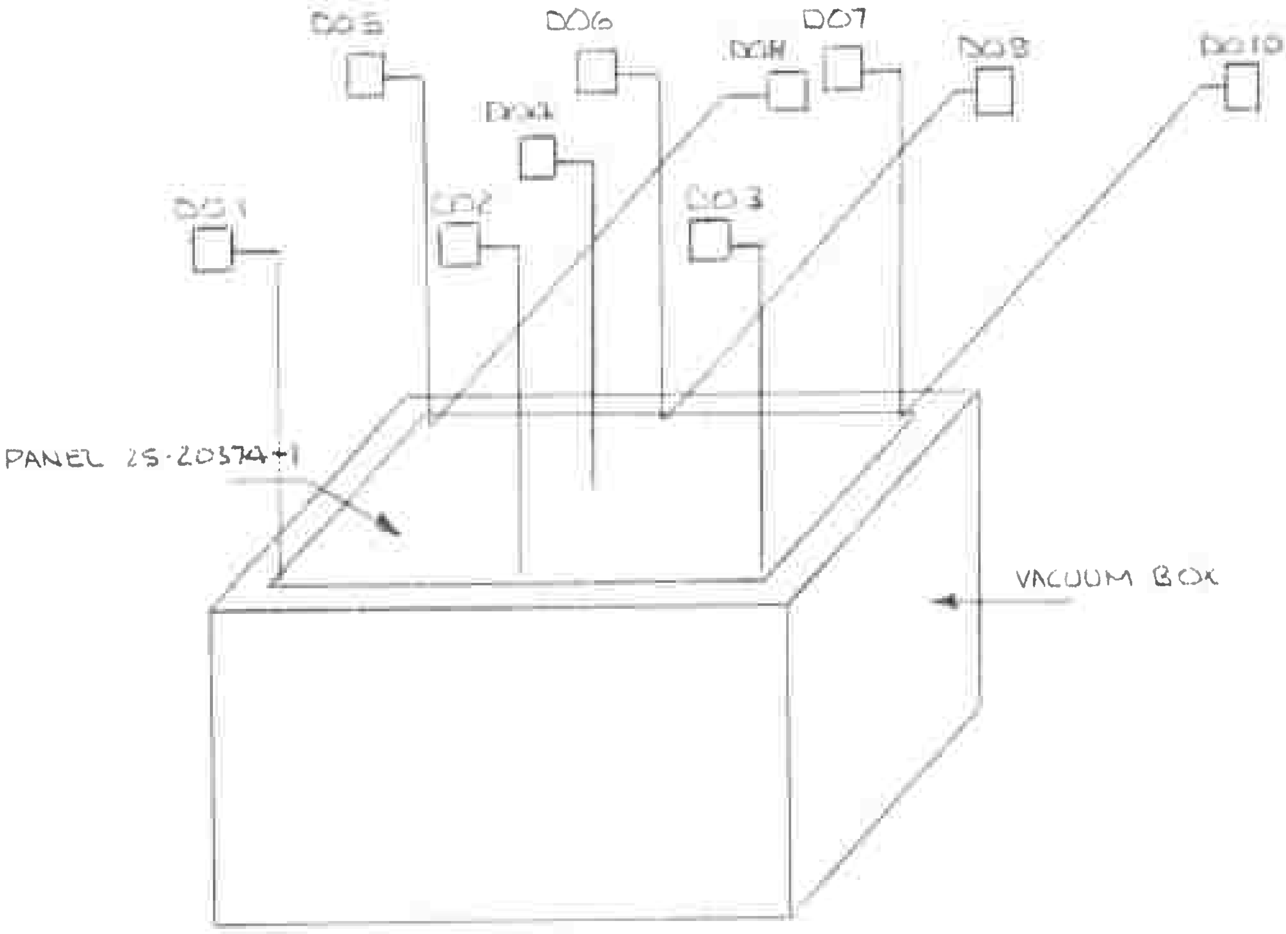


Schmeider 7-63

THERMOCOUPLE LOCATIONS
VACUUM BOX
6593-2-1

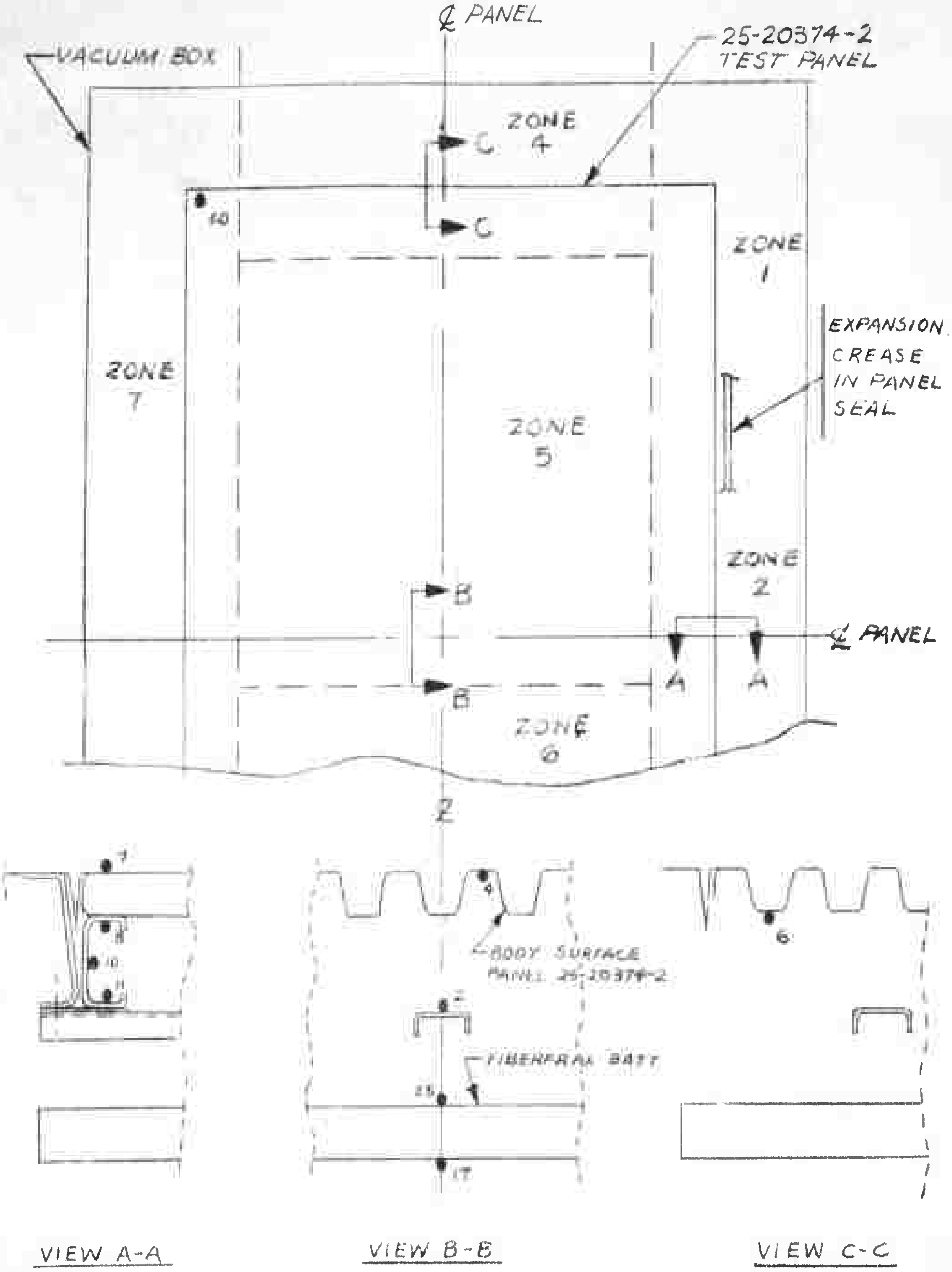
D2 80084

FIG

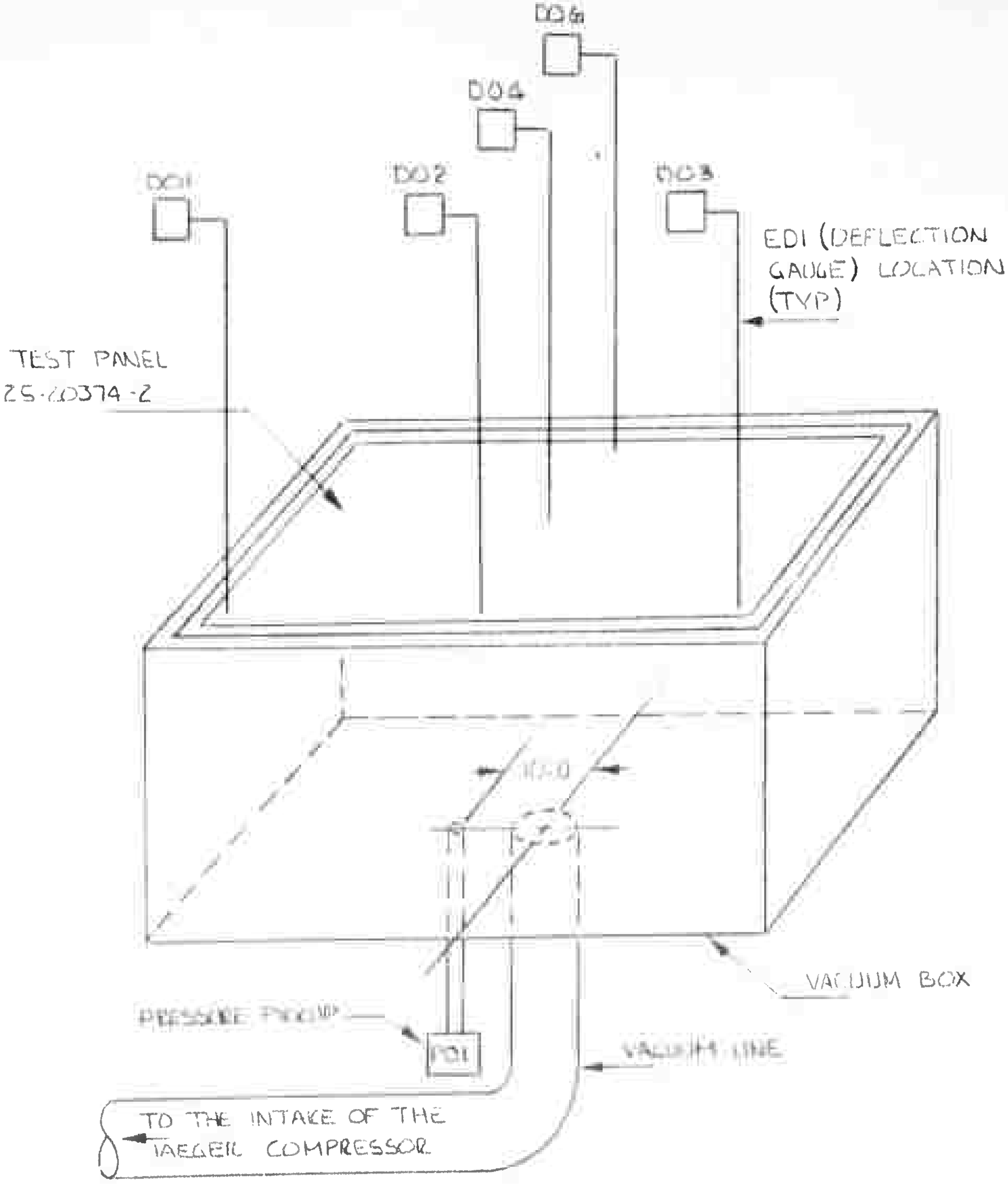


CALC	Schneid 7-63	REVISED	DATE	DEFLECTION GAGE LOCATIONS
CHECK				LT-5593-2-1
APPD				D2-80084
APPD				BOEING AIRPLANE COMPANY
				PAGE Fig 69

BAC 973 D R3

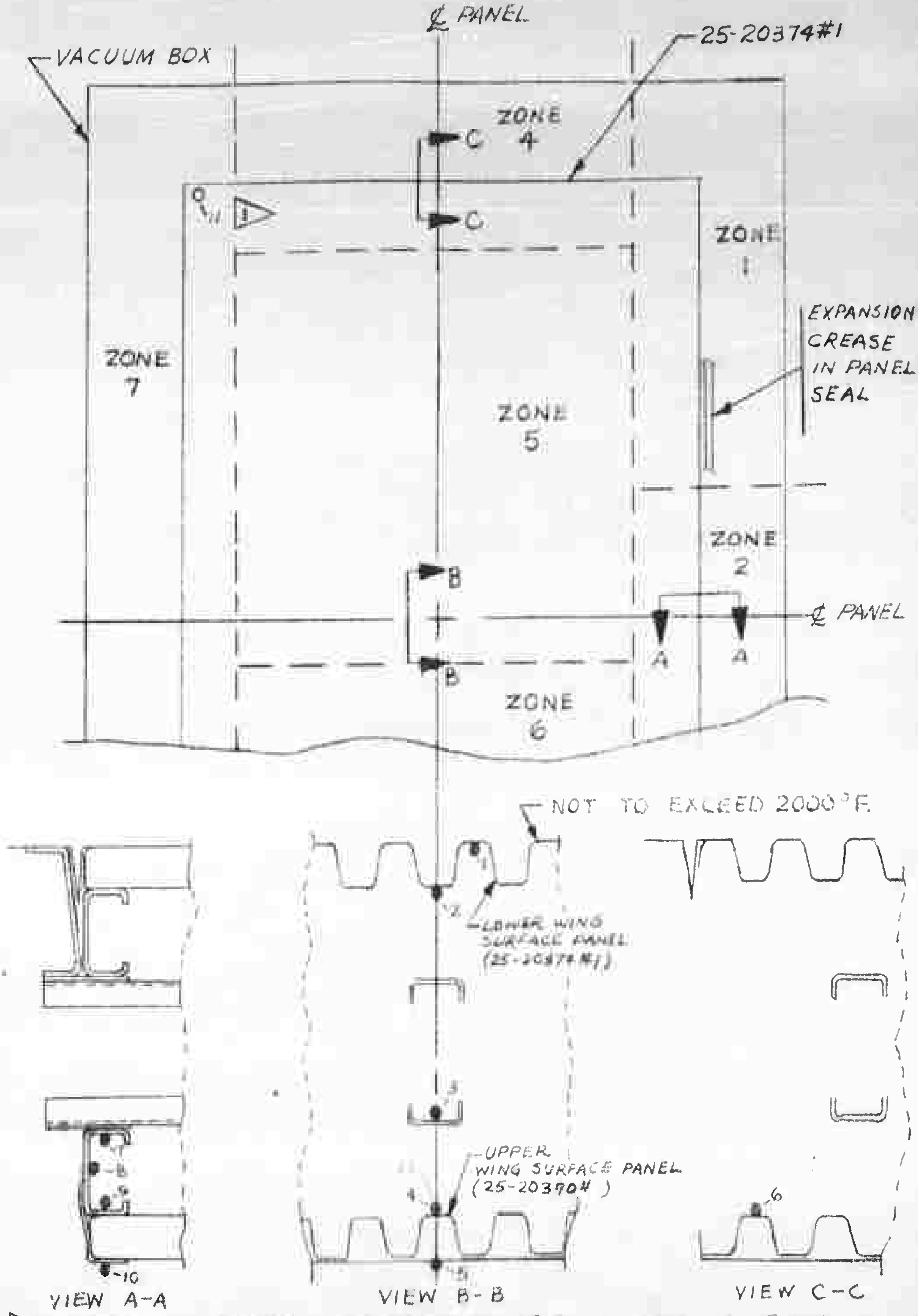


CALC	G. MILLS	7/17/61	REVISED	DATE	MONITOR THERMOCOUPLE LOCATIONS	Vol II
CHECK	E. Kenney	7/17/61			LT 2-2	D2-80084
APR						
APR					BOEING AIRPLANE COMPANY	PAGE
						FIG 70



CALC	Schneider	5-31-63	REVISED	DATE	DEFLECTION AND PRESSURE MEASUREMENT LOCATIONS WING PANEL TEST LT-2-2	VOL I
CHECK						D2-80084
APPD					THE BOEING COMPANY	PAGE Fig 71
APPD						

U3 4036 3000 REQ 10388

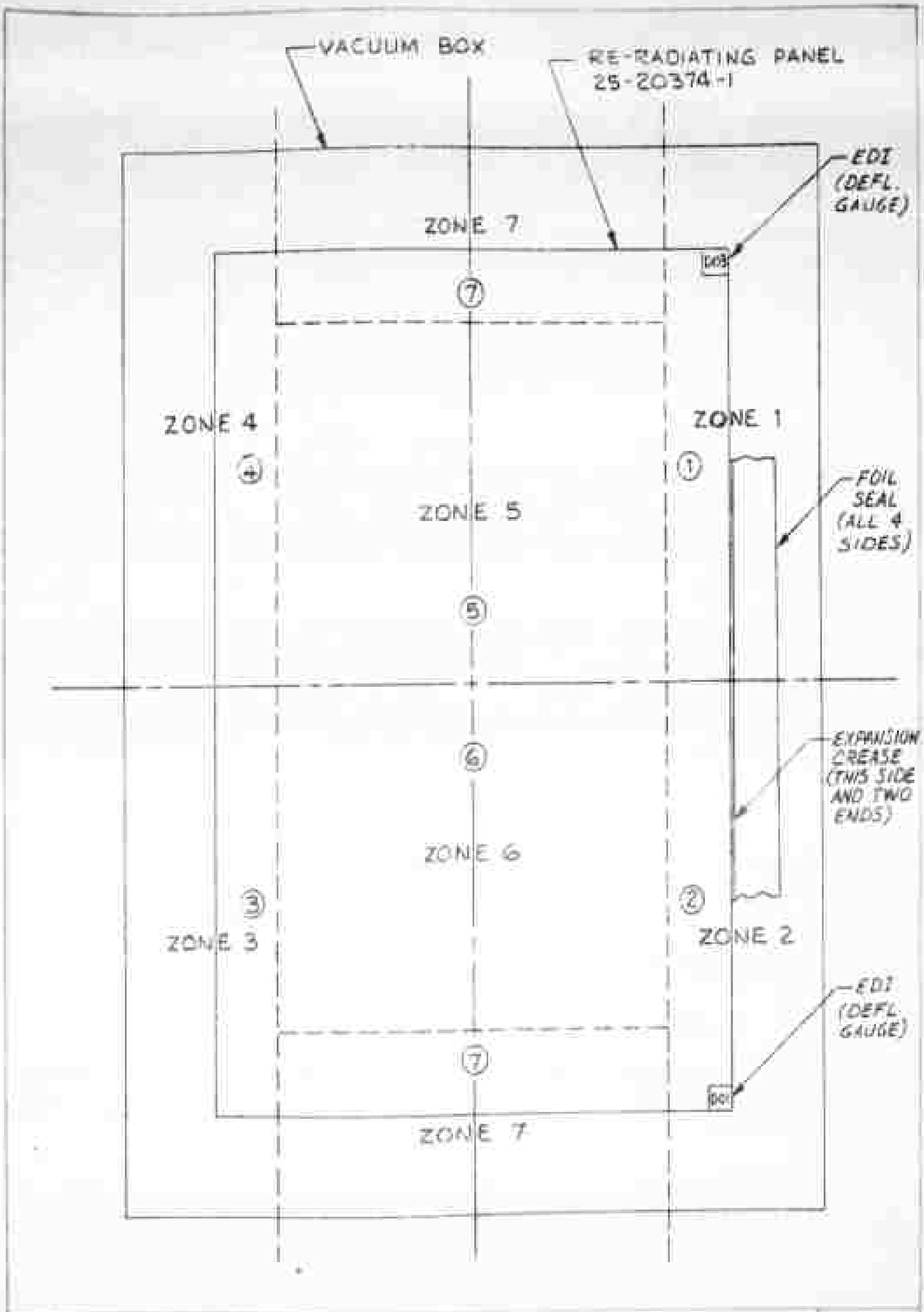


1 THERMOCOUPLE #11 LOCATED ON 25-20370 PANEL SKIN.

CALC	G. MILLS	8/22/61	REVISED	DATE	MONITOR THERMOCOUPLE LOCATIONS TEST LT-2-3 thru LT-2-6	Vol I
CHECK						D2-80084
APR					BOEING AIRPLANE COMPANY	PAGE Fig 72
APR						

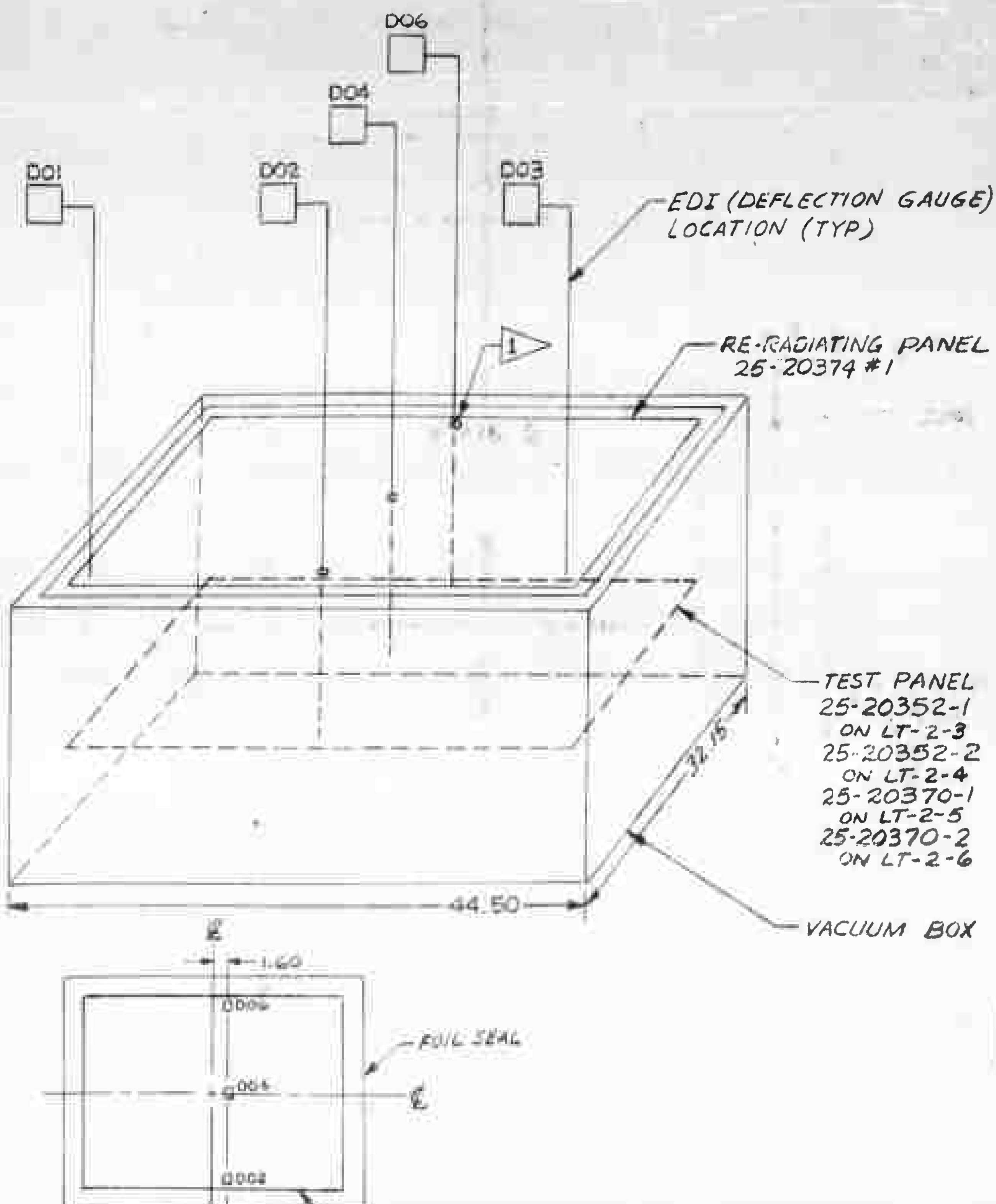
U3 4038 8000 (WAS BAC 1017 R5)

2 7000



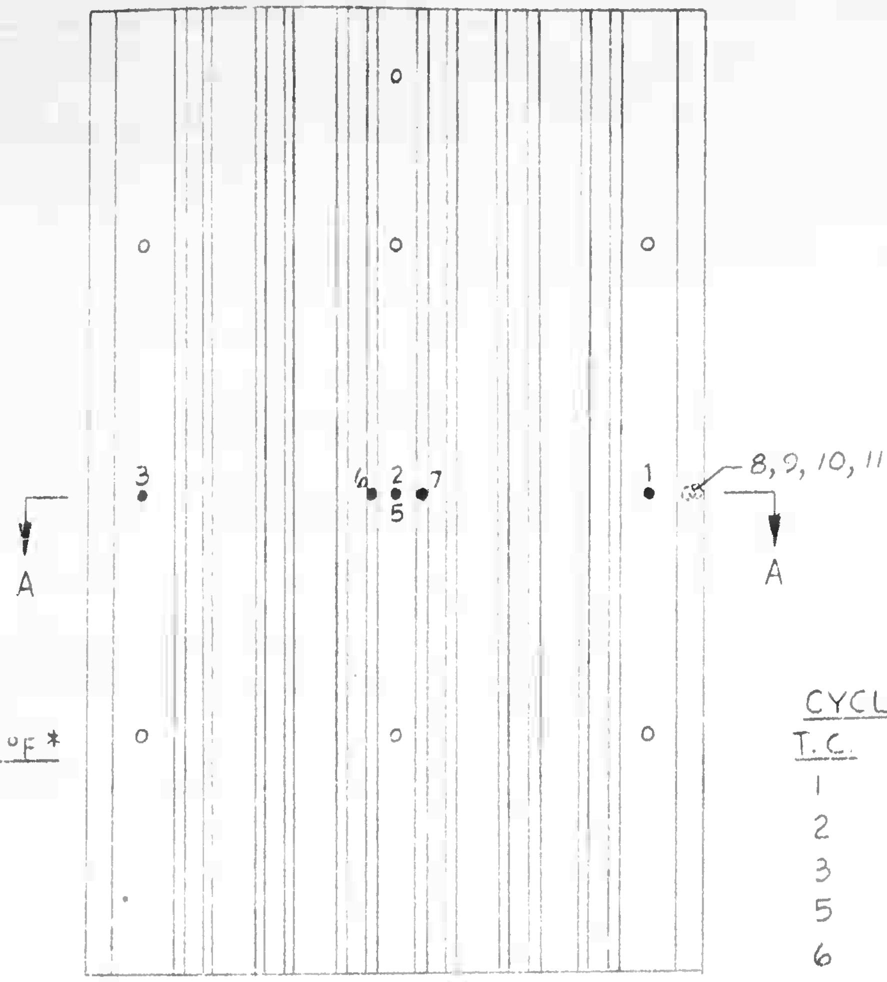
CALC	E. Denney 9/29/61	ZONE LAYOUT - EDI & T.C. LOCATIONS, OUTER PANEL 25-20374-1 LT-2-3 THRU LT-2-6	VOL I
CHECK			D2-80094
APP			
APPD		COMPANY	PAGE FIG 72

BAC 973 D R3



1 CLEARANCE HOLE IN OUTER PANEL FOR EDI ROD ATTACHED TO INNER PANEL (3 PLACES)

CALC	EKenney 9/28/61	REVISED DATE	DEFLECTION GUAGE LOCATIONS TESTS LT-2-3 THRU LT-2-6	VOL I
CHECK				D2-80024
APPD				
APPD			BOEING AIRPLANE COMPANY	PAGE FIG 7A

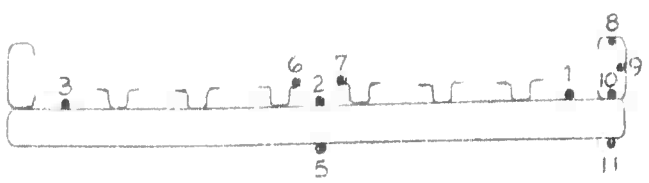


CYCLE 1

T.C.	TEMP.~°F*
1	1180
2	920
3	850
5	760
6	970
7	1050
8	1100
9	840
10	890
11	780

CYCLE 2

T.C.	TEMP.~°F*
1	1160
2	1000
3	930
5	810
6	1030
7	1060
8	1090
9	860
10	910
11	800



A - A

● MONITOR THERMOCOUPLES

○ CONTROL THERMOCOUPLES

* AT PEAK OF CYCLE

			REVISED	DATE
CALC	E. Klemmey	1-16-62		
CHECK				
APPD				
APPD				

THERMOCOUPLE LOCATIONS & PEAK TEST TEMPS. ~ UNSYMMETRICAL HEAT TEST LT-2-6B

BOEING AIRPLANE COMPANY
SEATTLE 24 WASHINGTON

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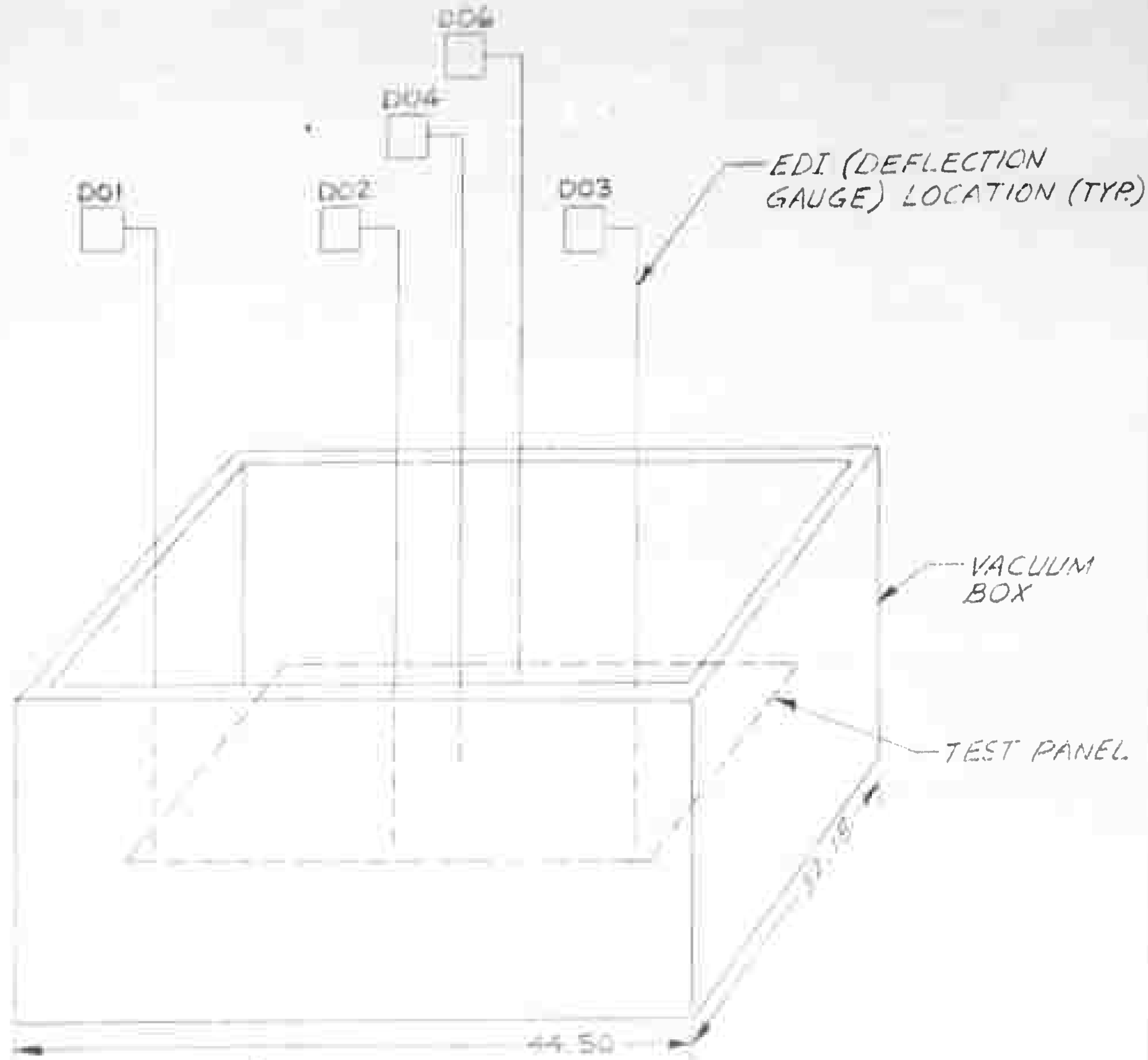
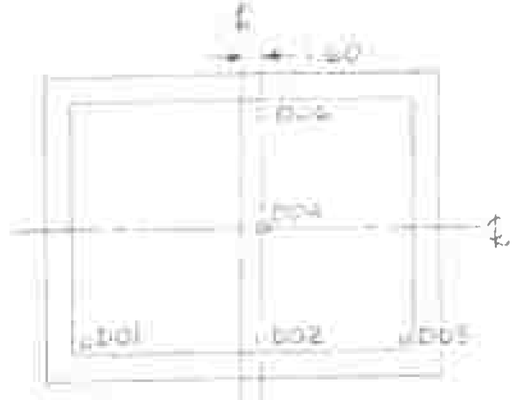
PAGE FIG 75

BAC 973 D R3

2-7000





PEAK DEFLECTIONS

CYCLE 1 EDI #	CYCLE 1 DEFL @ 3.75 min.	CYCLE 2 EDI #	CYCLE 2 DEFL @ 3.75 min.
D01	.010	D01	.025
D02	.295	D02	.310
D03	-.010	D03	-.023
D04	.465	D04	.490
D06	.260	D06	.300

CALC	E Denney 1-23-2	REVISED	DATE
CHECK			
APPD			
APPD			

DEFLECTION GUAGE LOCATIONS
UNSYMMETRICAL HEAT TEST
LT-2-6B

BOEING AIRPLANE COMPANY

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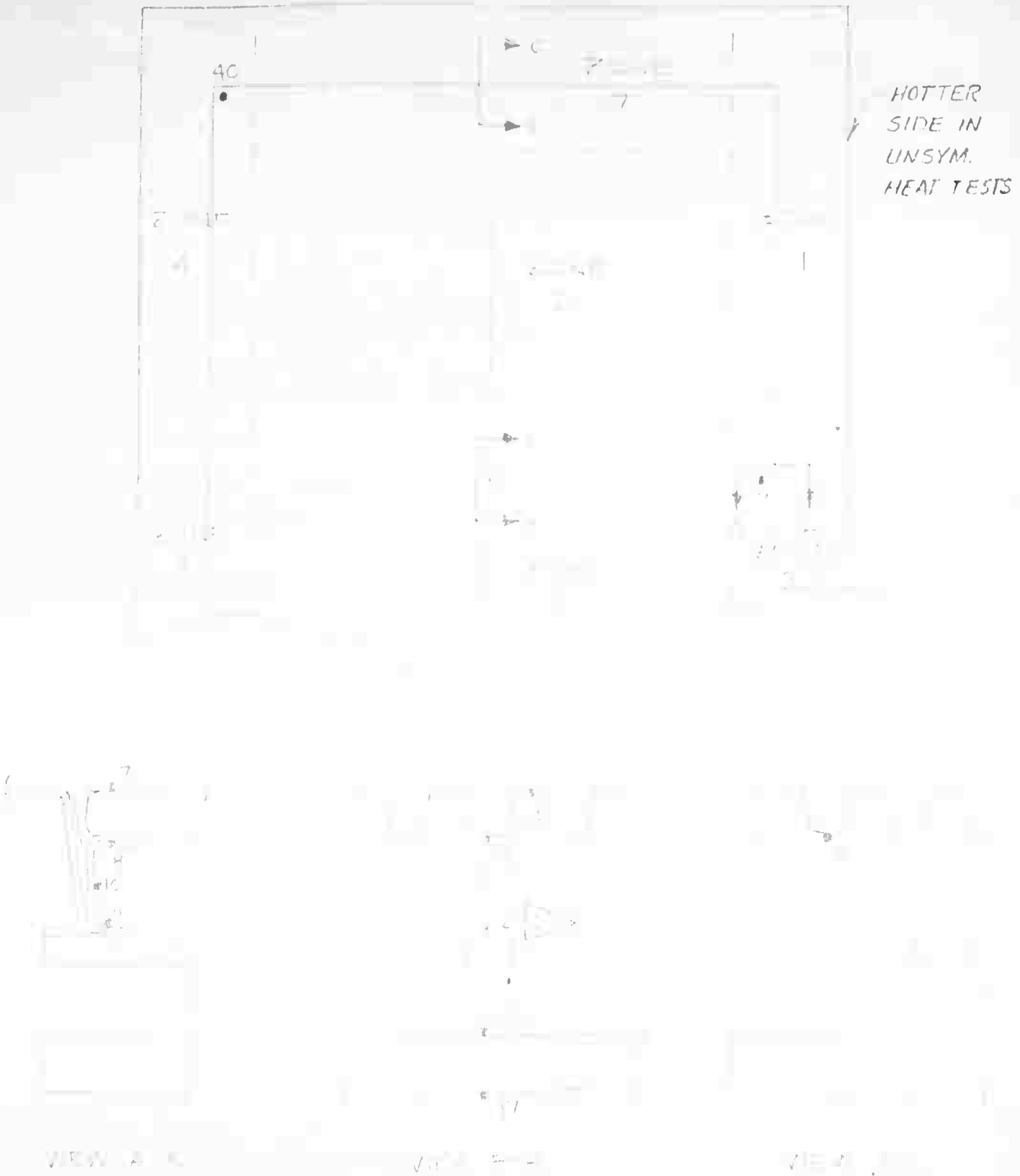
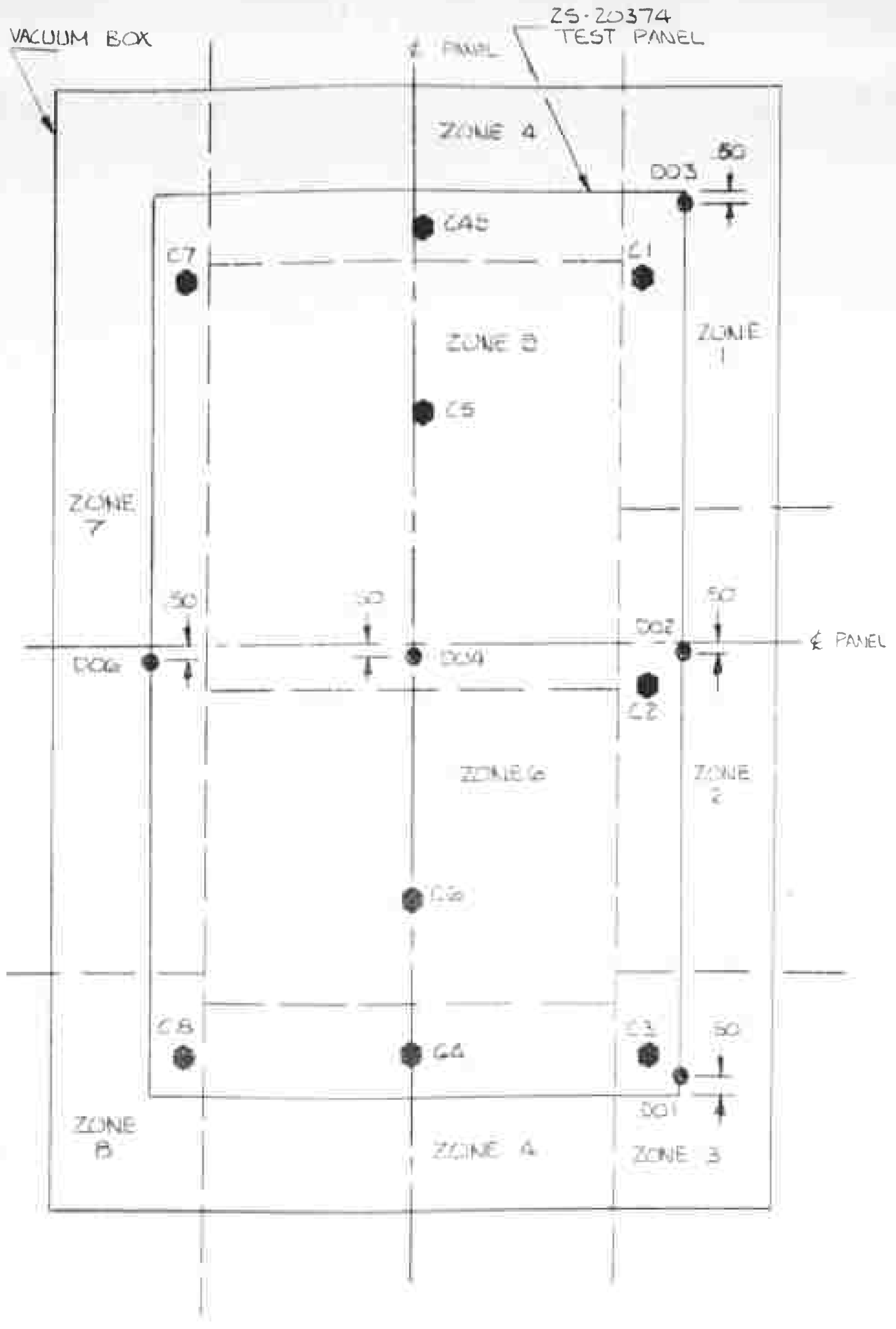
PAGE Fig.



CALC			REVISED	DATE		VOL I
CHECK						D2-80084
APR						
APR					BOEING AIRPLANE COMPANY	PAGE

BAC 1017-R5

2 7000



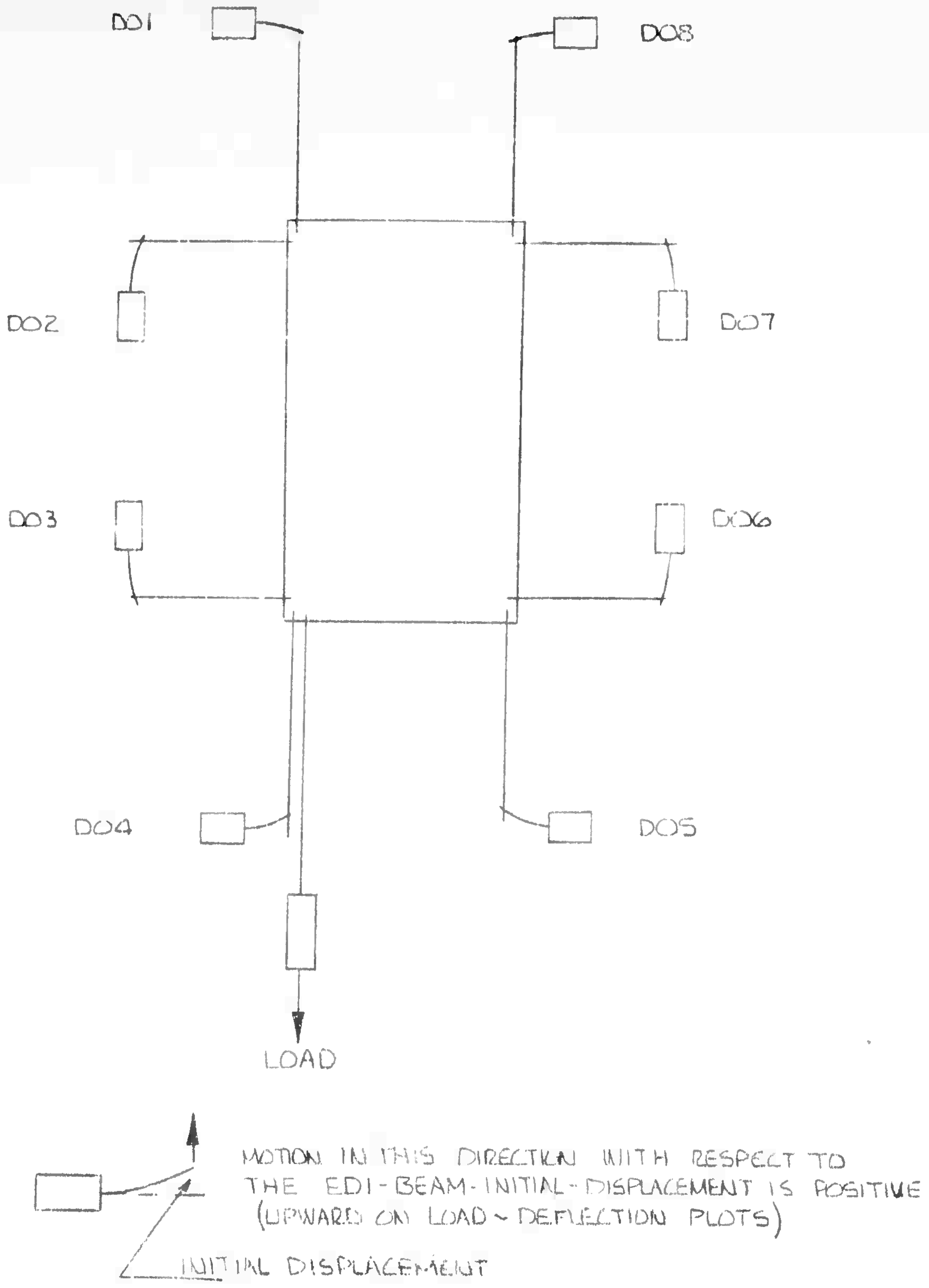
CALC	Schneider	5-31-63	DATE
CHECK			
APPD			
APPD			

DEFLECTION AND CONTROL
THERMOCOUPLE LOCATIONS
WING PANEL TESTS LT-3-1, 4-1, 4-2

THE BOEING COMPANY

D2-80084

U3 4036 3000 PFO 10388



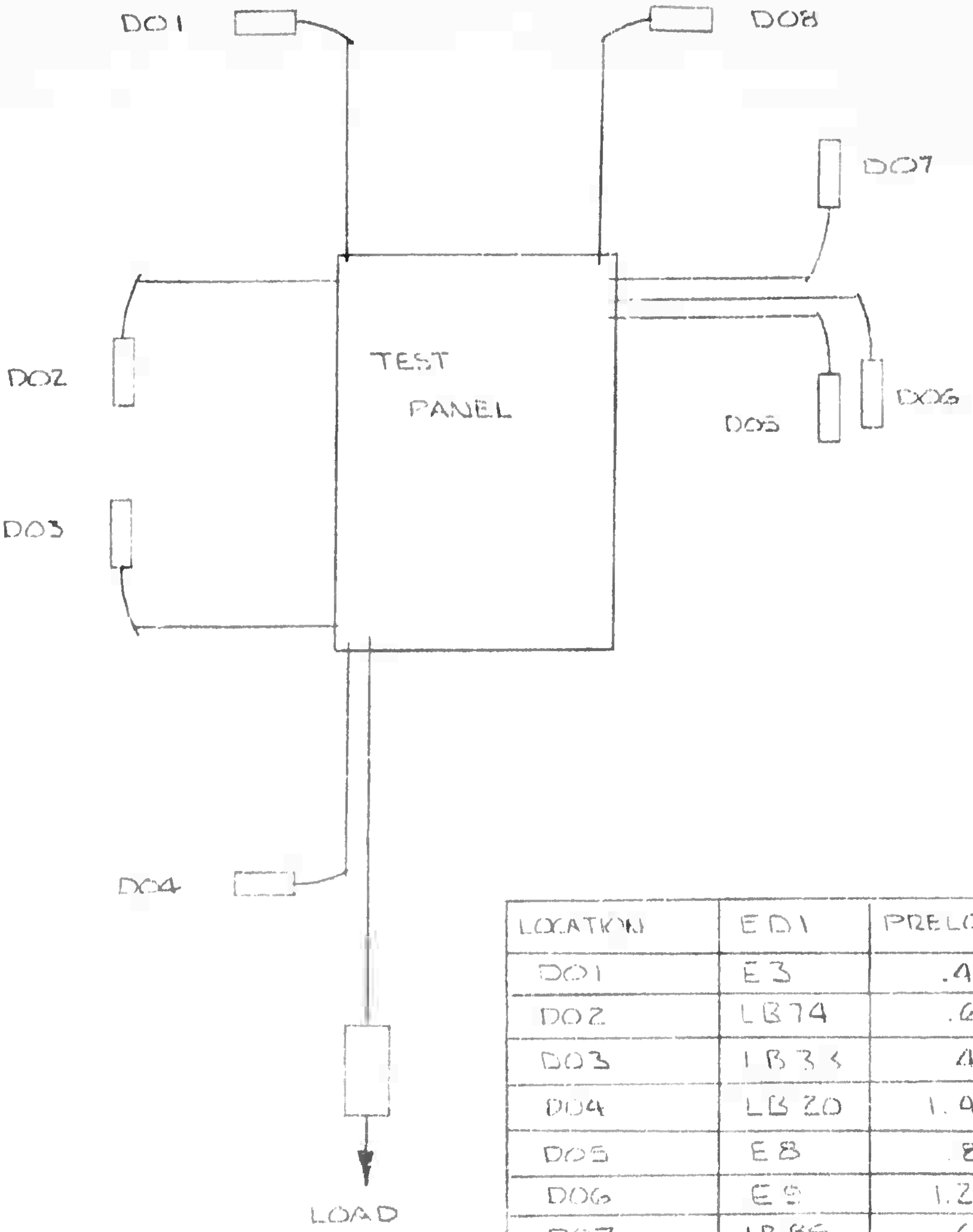
CALC	Schneider 6-63	REVISED	DATE
CHECK			
APPD			
APPD			

EDI LOCATIONS
TEST LTS-593-3-2

[illegible]

THE BOEING COMPANY

U3 4036 3000 REQ 10388



LOCATION	EDI	PRELOAD
DO1	E3	.4
DO2	LB74	.6
DO3	LB33	4
DO4	LB20	1.4
DO5	E8	.8
DO6	E9	1.2
DO7	LB55	.6
DO8	E12	.4

CALC	Schmeich	5-31-63	REVISED	DATE	EDI LOCATIONS TEST LT 5-593-3-3
CHECK					
APPD					THE BOEING COMPANY
APPD					

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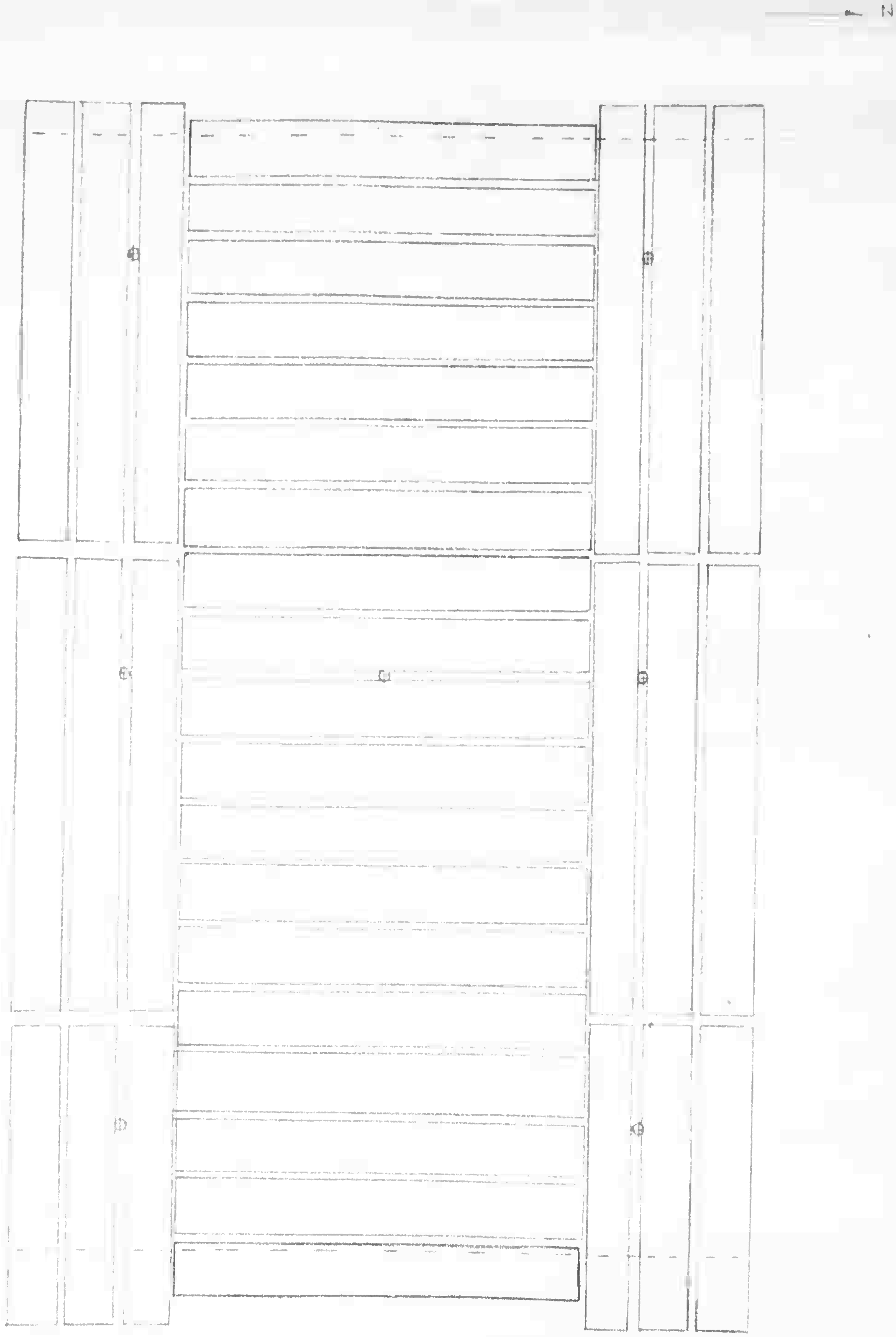
PAGE Fig 80

U3 4036 3000 REQ 10388



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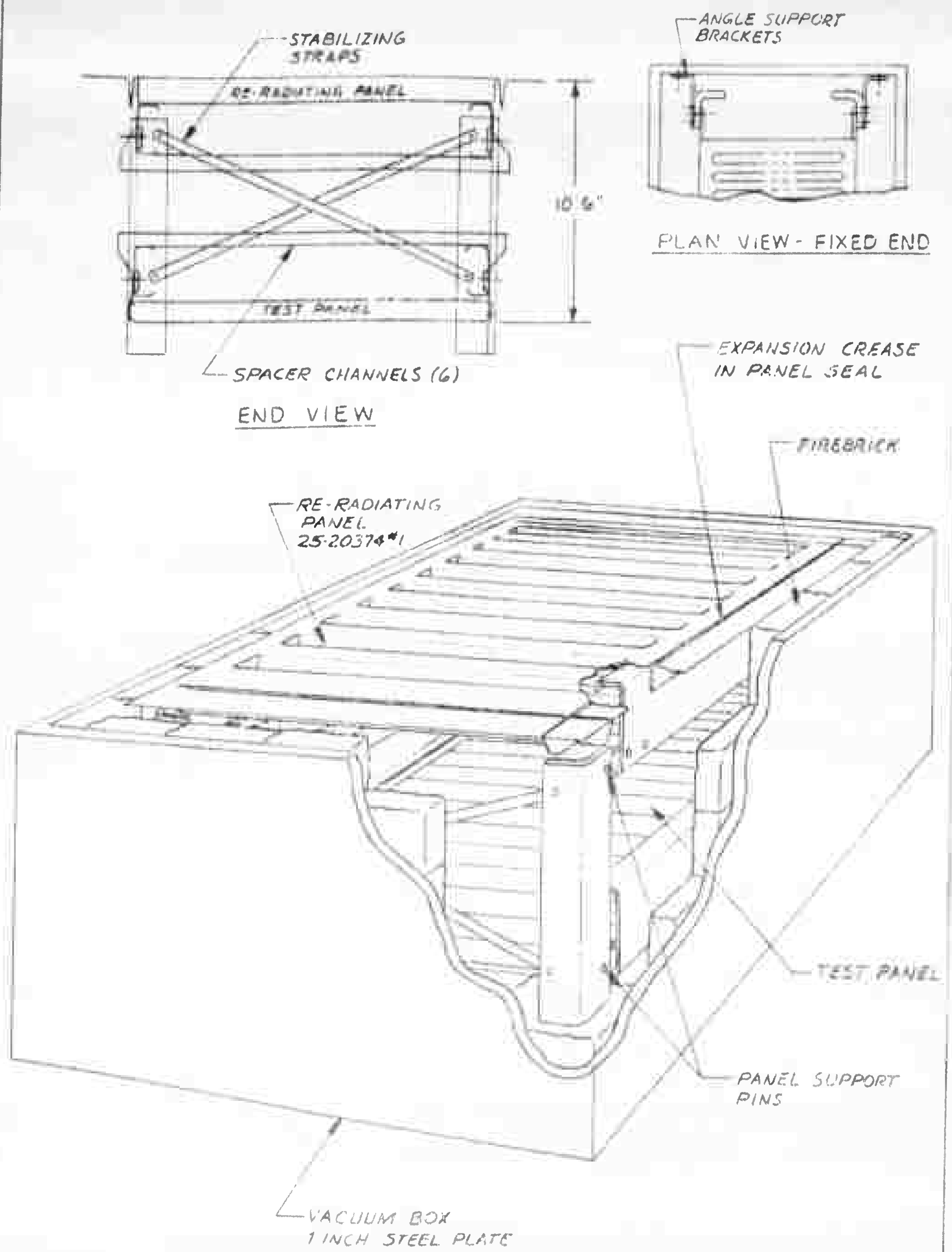
BOEING AIRPLANE COMPANY



CALC	[illegible]	10/6/61	REVISED DATE
CHECK			
APPD			
APPD			

TEST PANEL INSTALLATION
THERMAL FATIGUE TESTS
LT-2-3 THRU LT-2-6

BOEING AIRPLANE COMPANY
SEATTLE 24 WASHINGTON

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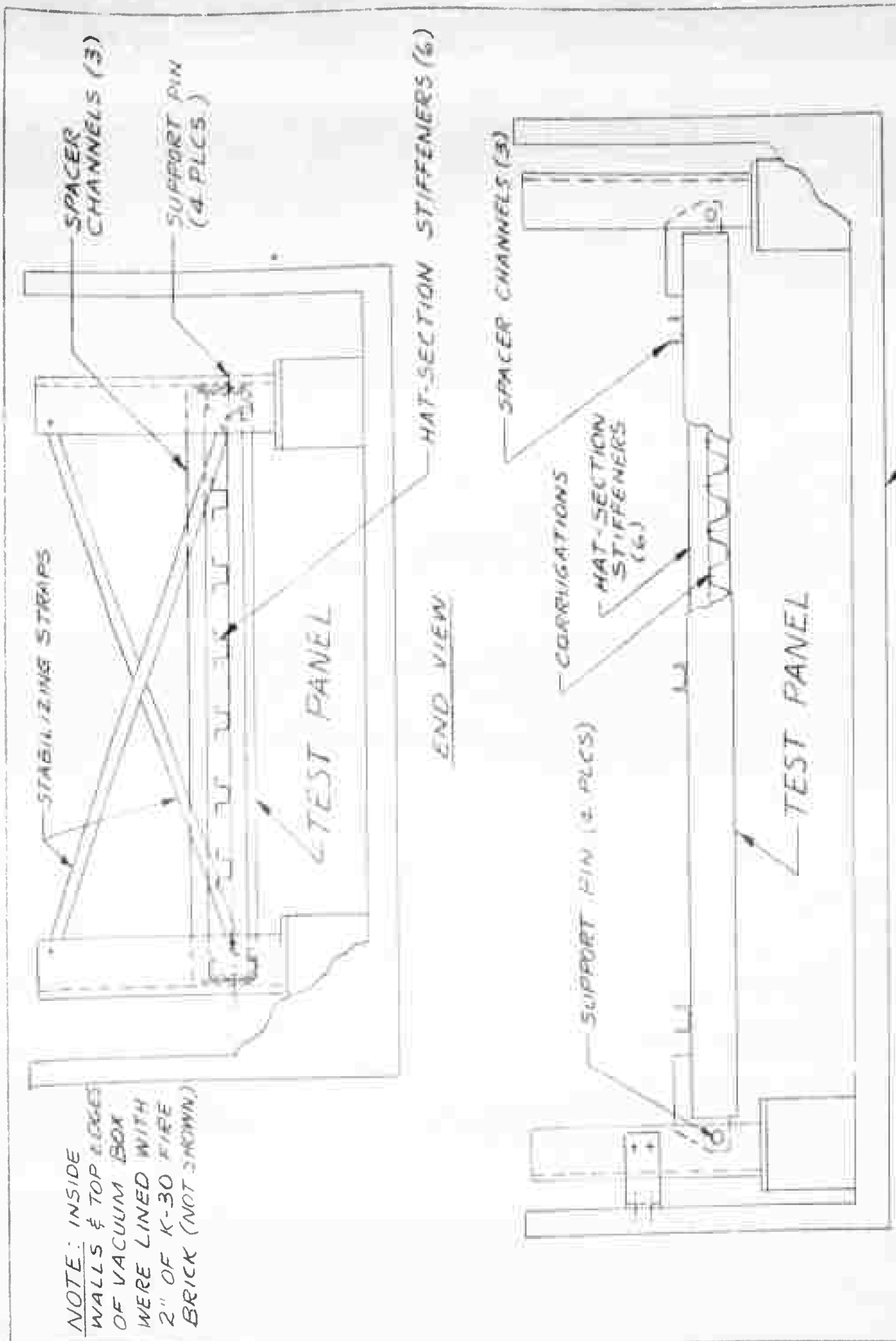
PAGE FIG. 82

BAC 973 D R3

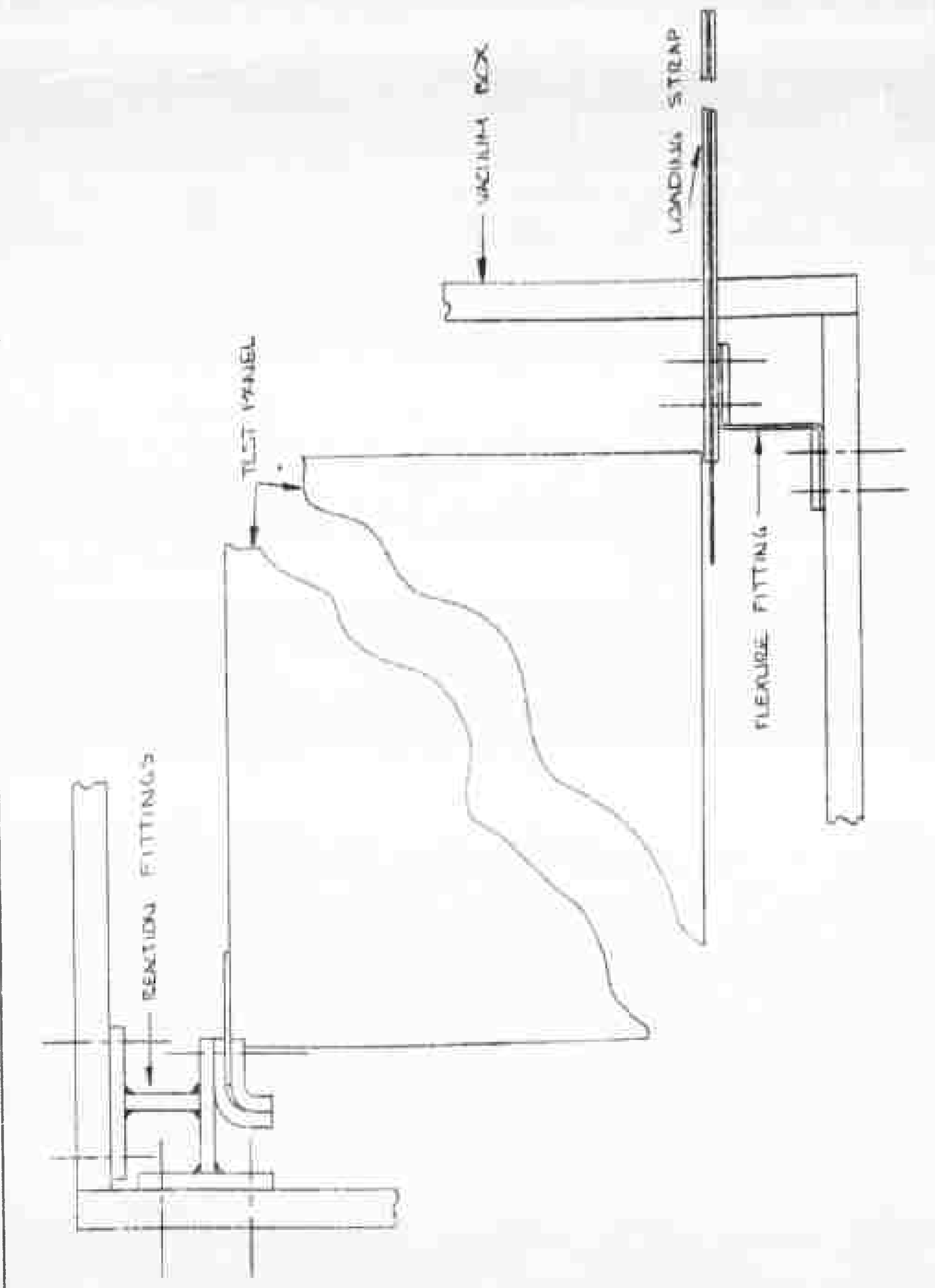
2-7000



CALC	[signature]	1-23-2	REVISED	DATE	TEST INSTALLATION DETAILS DS-1 PANEL UNSYMMETRICAL HEAT TEST LT-2-6B
CHECK					
APPD					BOEING AIRPLANE COMPANY
APPD					

D2-80084

FIG



CALC	Schneider 6-10-63	REVISED	DATE
CHECK			
APPD			
APPD			

TEST PANEL MOUNTING GENERAL ARRANGEMENT, LT-5593-3

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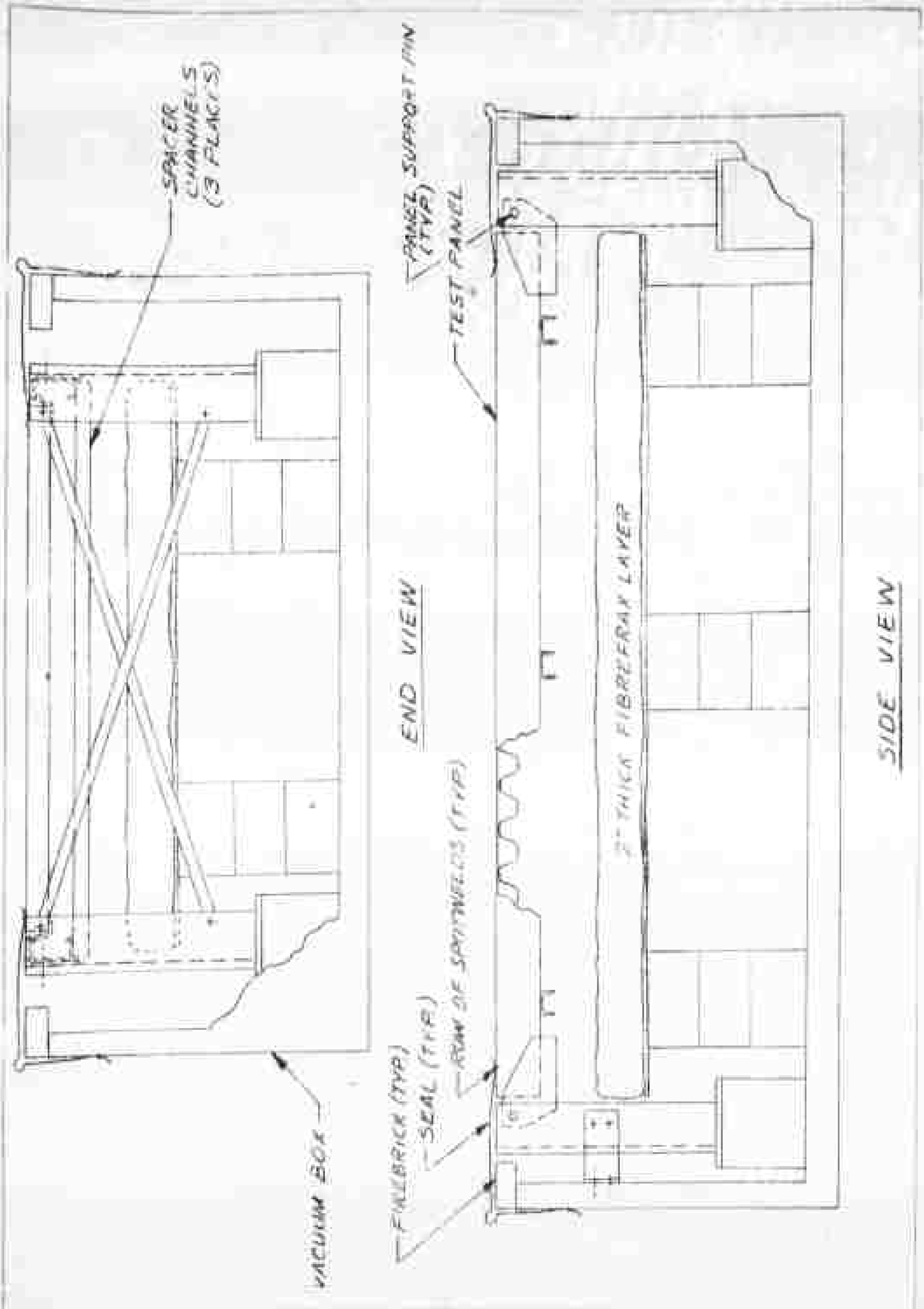
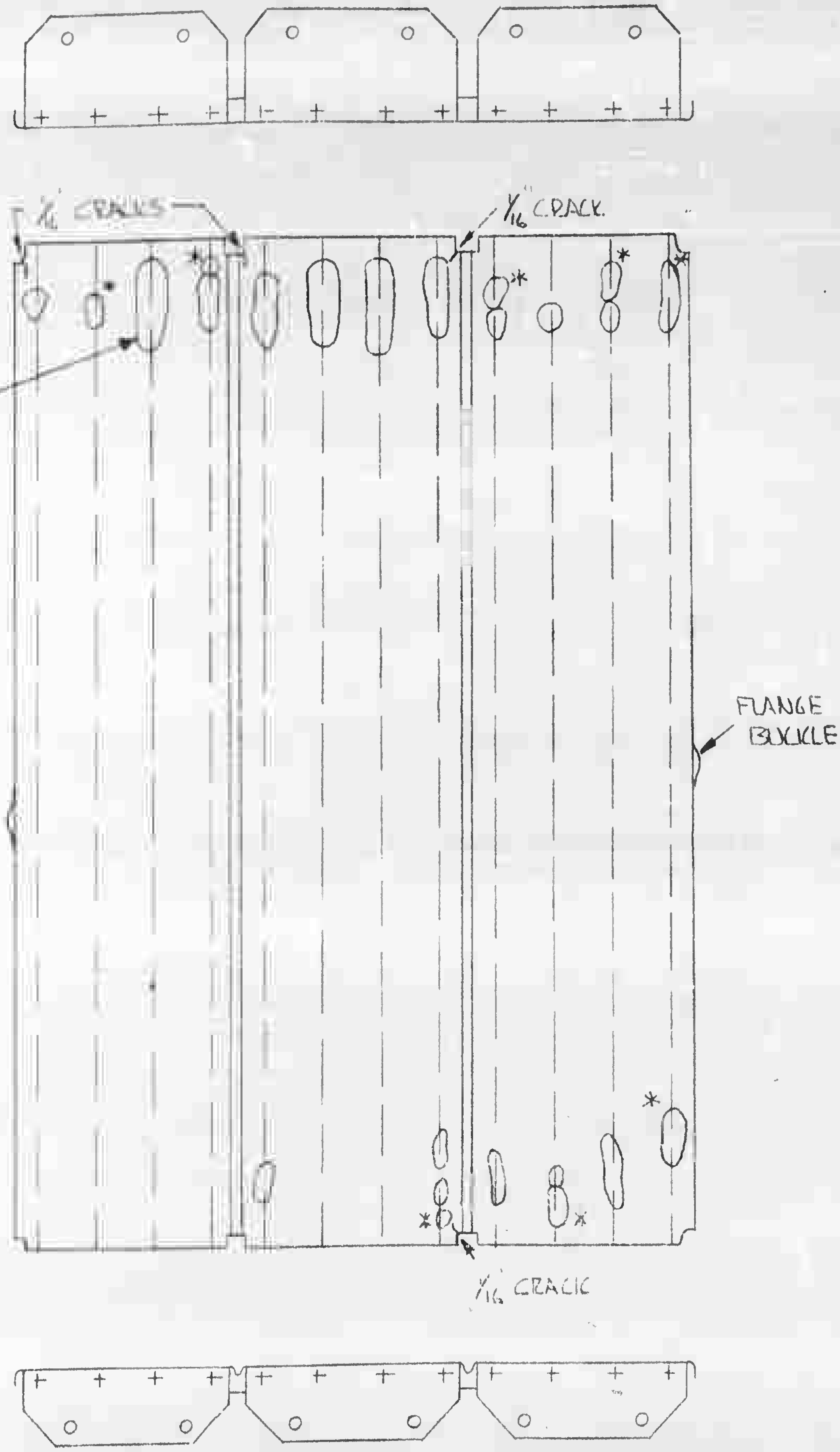
PAGE

THE BOEING COMPANY



CALC	E.Bonney	1-31-2	REPRESENTATIVE PANEL INSTALLATION TESTS LT-4-2, -4-3 & -4-4 ~DS WG. PANEL UNSYM. HEAT & PRESSURE TESTS
CHECK			D2-80084
APPD			BOEING AIRPLANE COMPANY
APPD			PAGE



* FAILURE DUE TO SONIC TESTING

CALC	Schmeid 6-7-63	REVISED	DATE
CHECK			
APPD			
APPD			

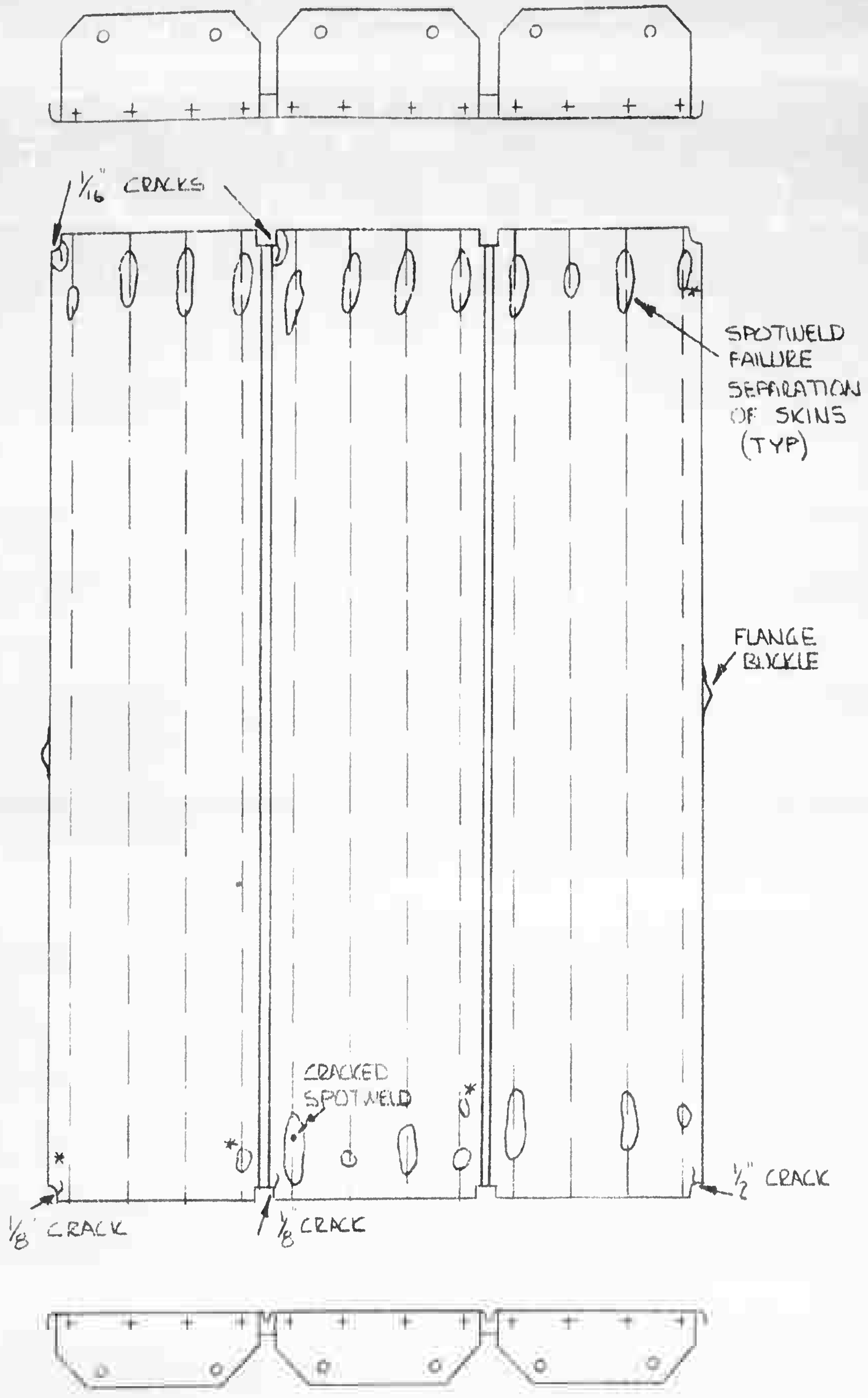
PANEL 25-20344-1 AFTER HEAT AND SONIC TESTING
PANEL 1479

THE BOEING COMPANY

D2-[illegible]

PAGE

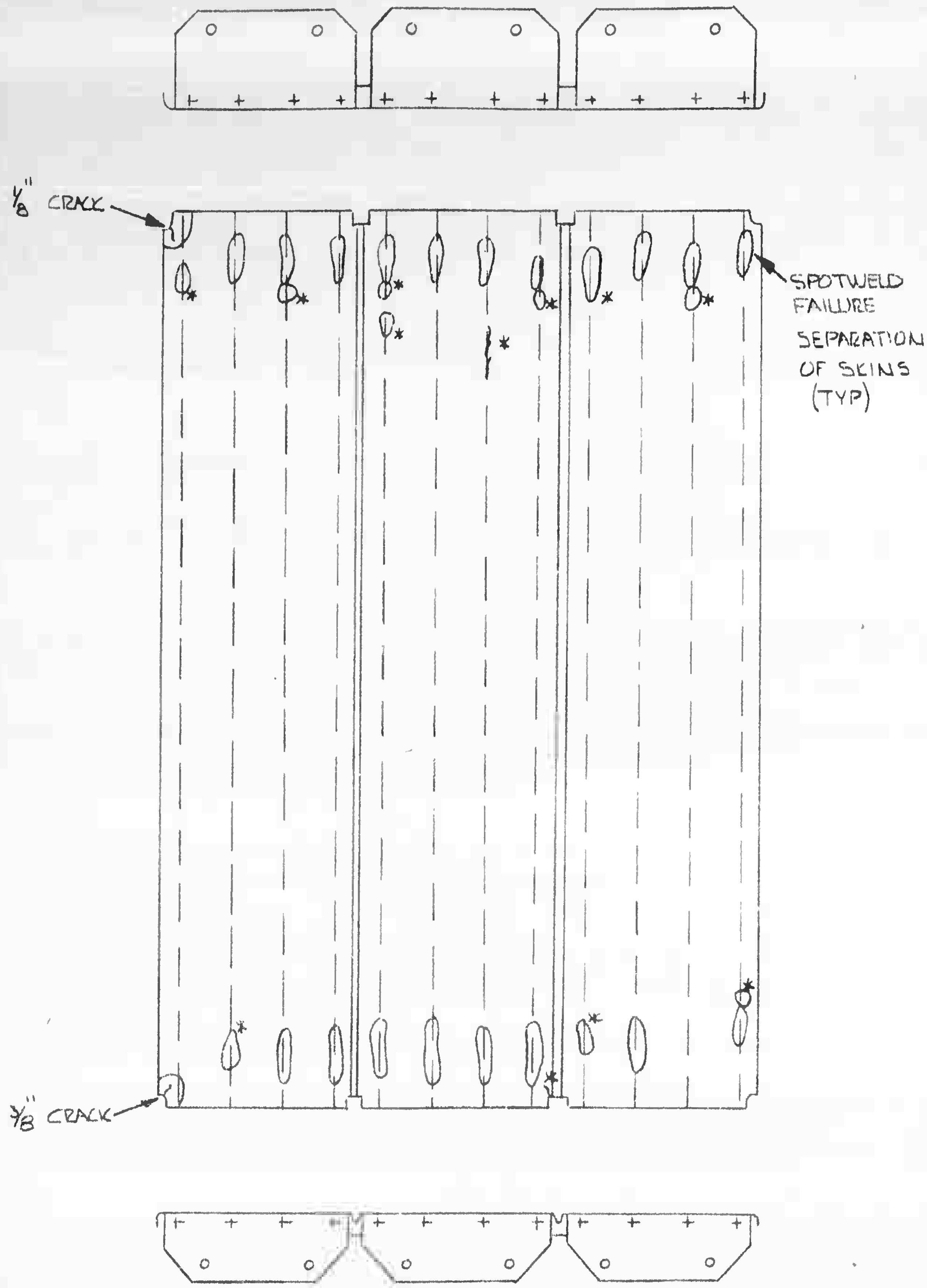
U3 4036 3000 REQ 10388



* FAILURE DUE TO SONIC TESTING

CALC	Schneider	6-7-63	REVISED	DATE	PANEL 25-20344-1 AFTER HEAT AND SONIC TESTING PANEL 1478
CHECK					
APPD					
APPD					THE BOEING COMPANY

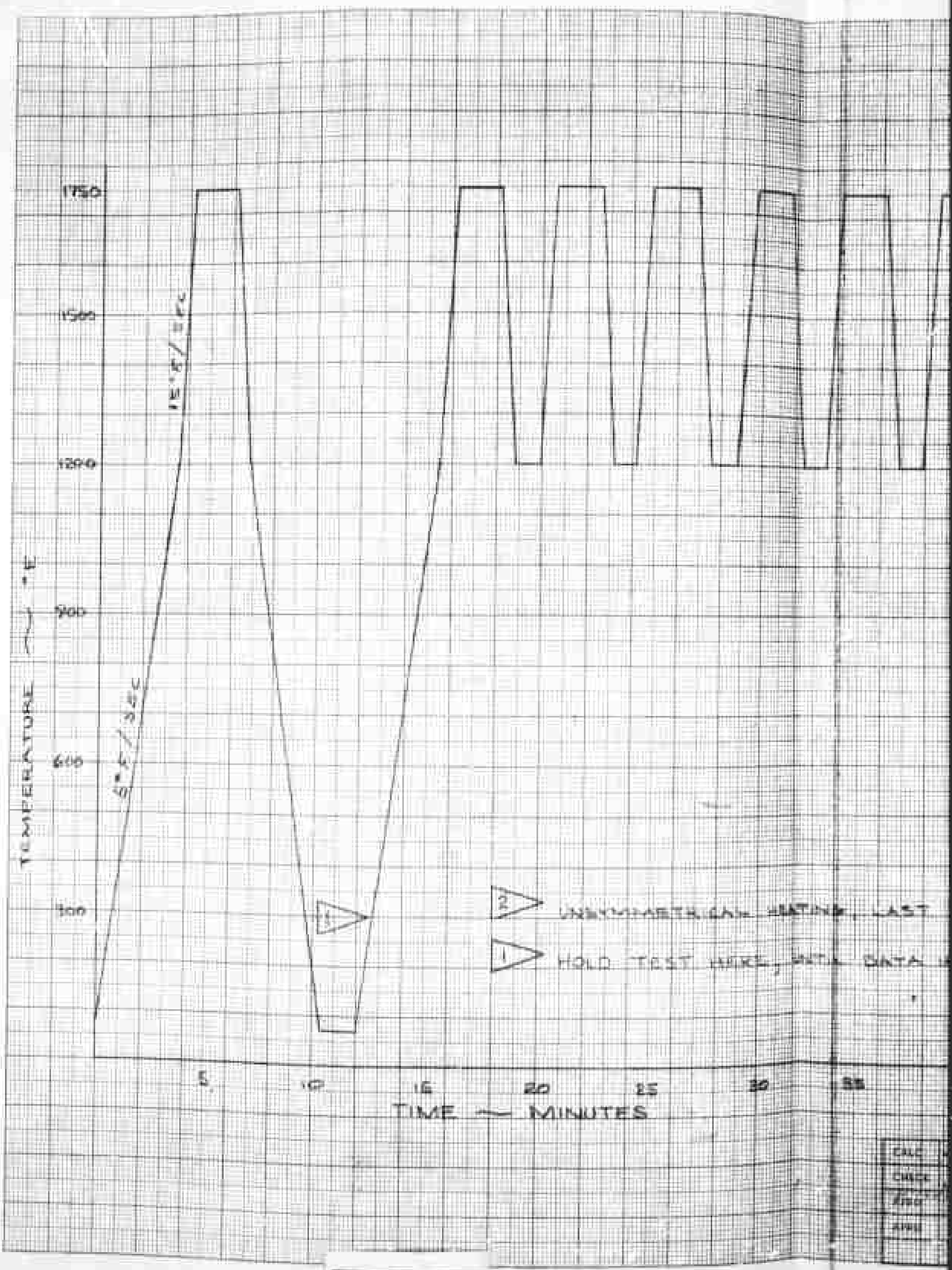
U3 4036 3000 REQ 10388



* FAILURES DUE TO SONIC TESTING

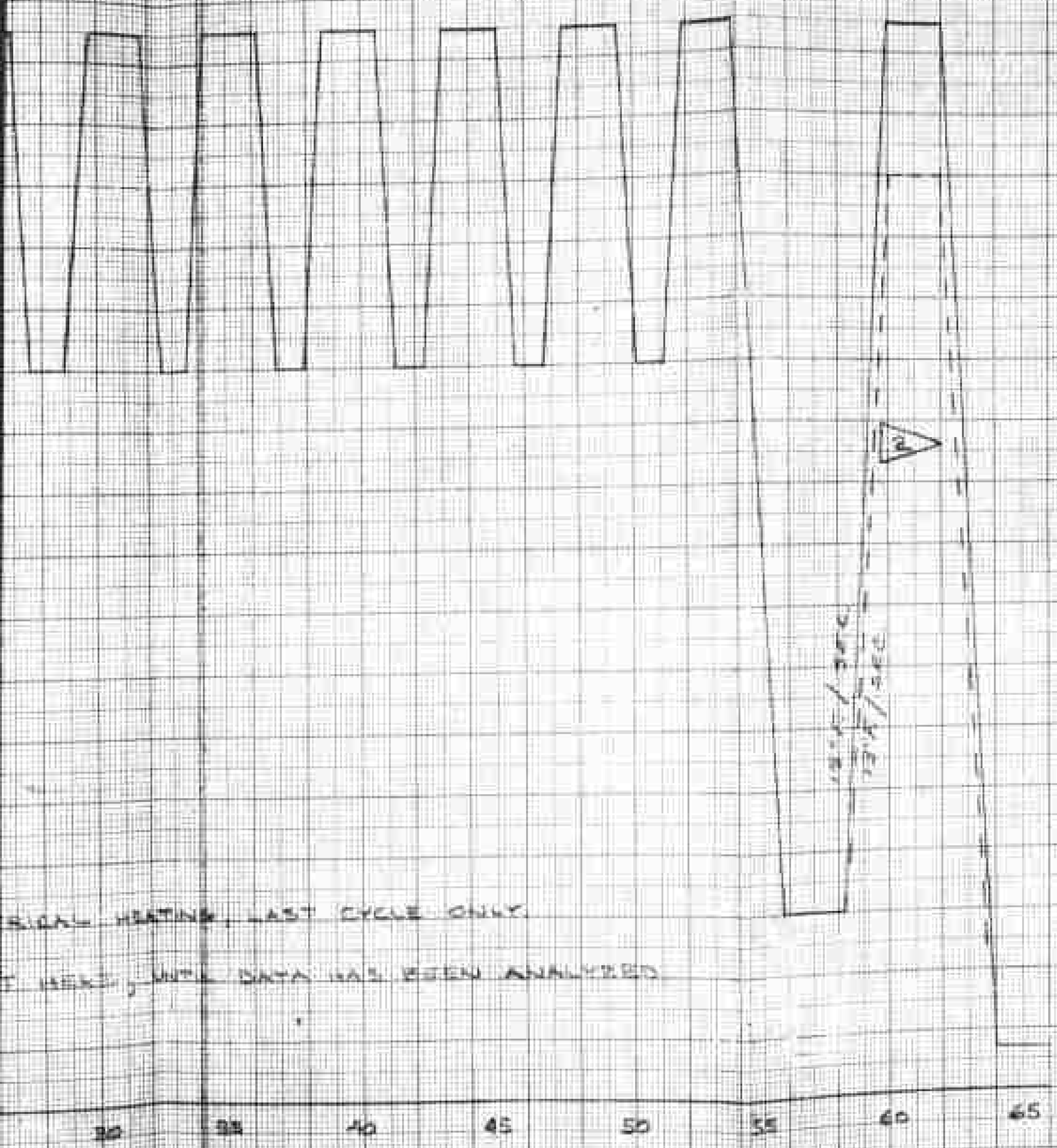
CALC	Schmeich	6-7-63	REVISED	DATE	PANEL 25-20344-1 AFTER HEAT AND SONIC TESTING PANEL 1477
CHECK					D2-80084
APPD					THE BOEING COMPANY
APPD					PAGE

U3 4036 3000 REQ 10388



1750
1500
1200
900
600
300
TEMPERATURE ~ °F
5°F/SEC
15°F/SEC
5
10
15
20
25
30
35
TIME ~ MINUTES
2 UNSYMMETRICAL HEATING, LAST
1 HOLD TEST HERE, UNTIL DATA
CALC
CHECK
APPD
APPD

[redacted]



CALC	NEIGHBORS	4-7-61	REVISED	DATE
CHECK	JENSEN	4-11-61		
APPD				
APPD				

TEST PROGRAM
LT 5-598-2-1
SK 11-95782

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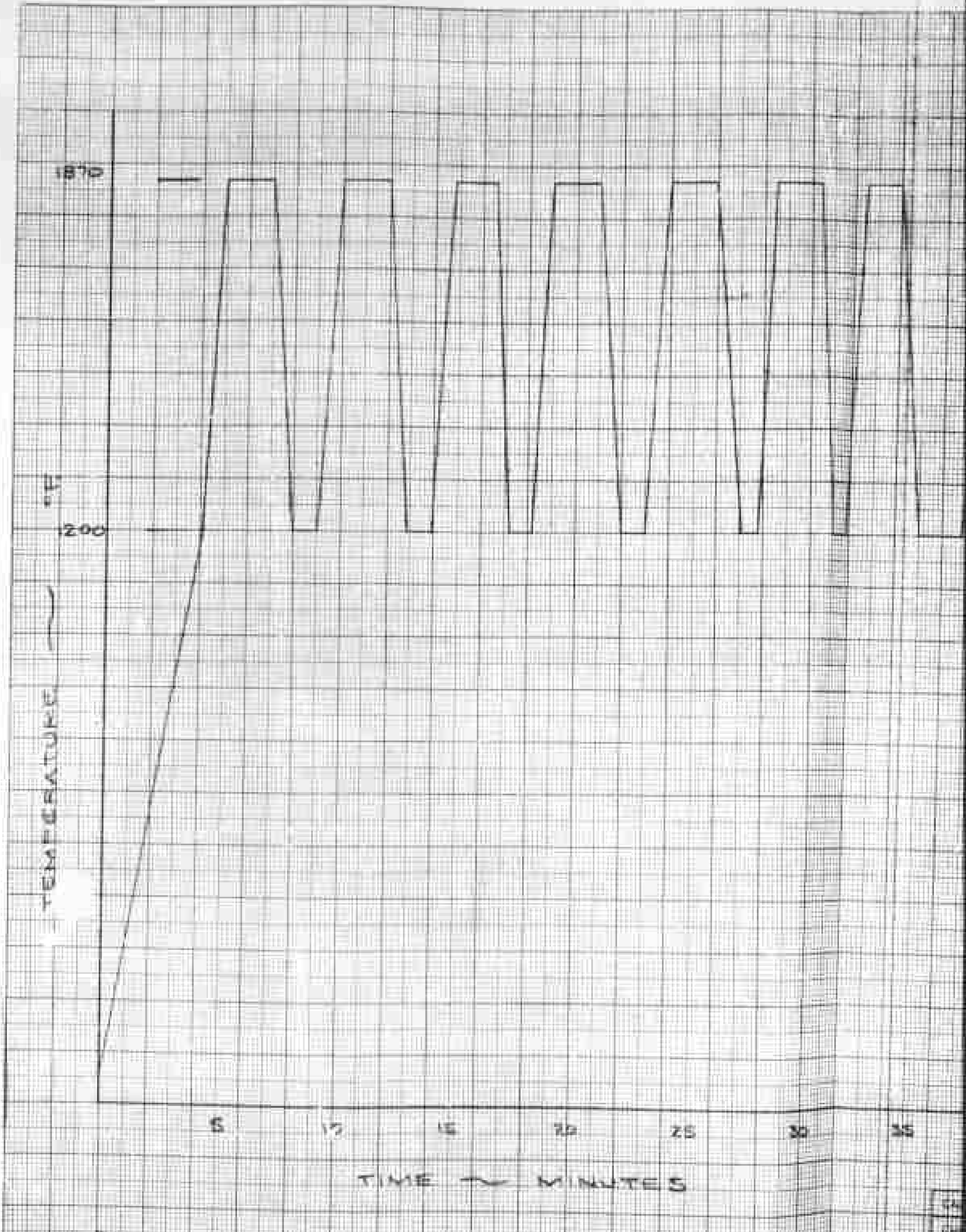
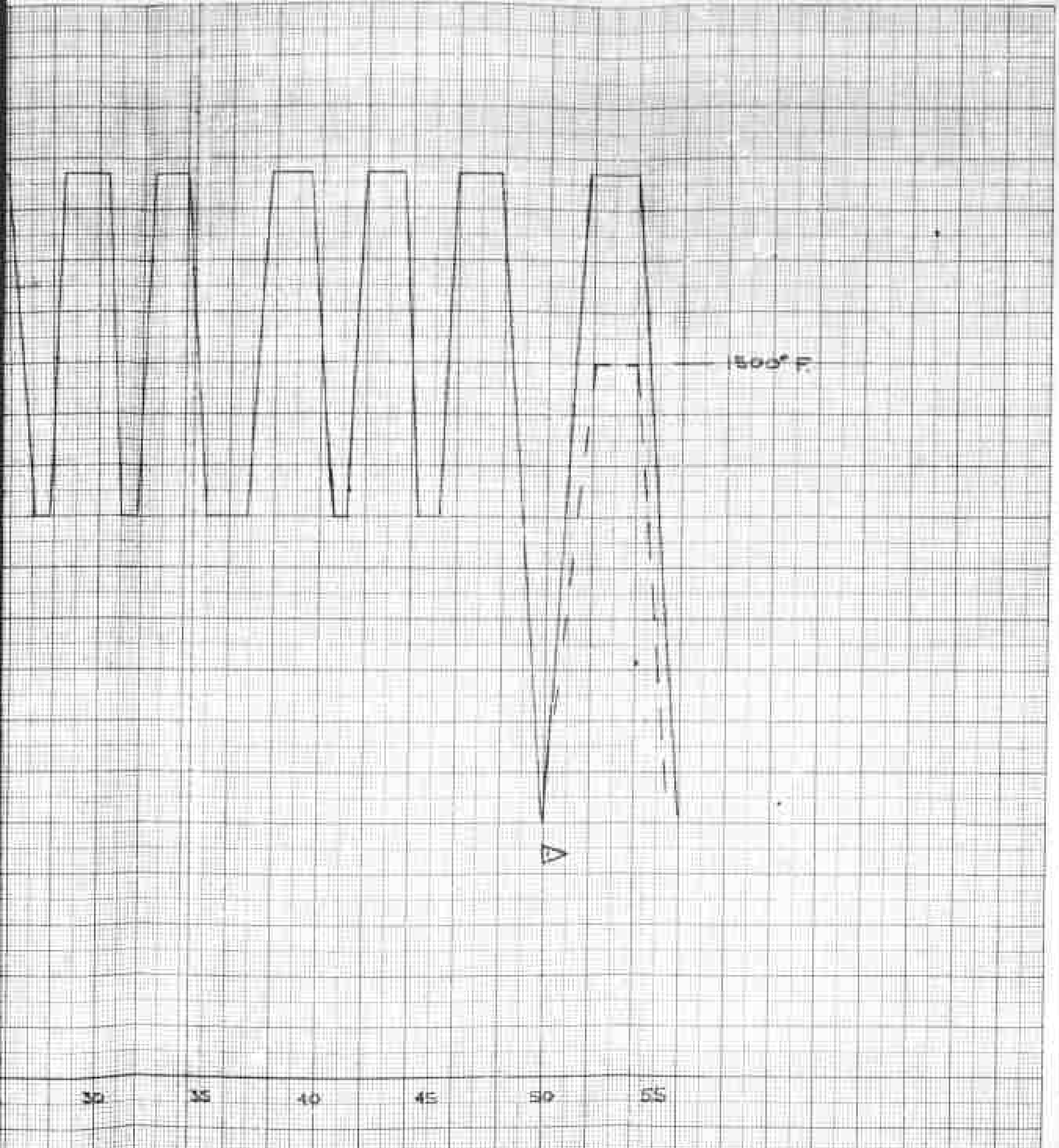
PAGE FIG. 15

BAC 1053 R-6



1 UNSYMMETRICAL HEATING CURVE



CALC ED N.			
CHECK			
APPR			
APPD			

PANEL ATTACHMENT
TYPE I PRELIMINARY
LT 5-593-2-2

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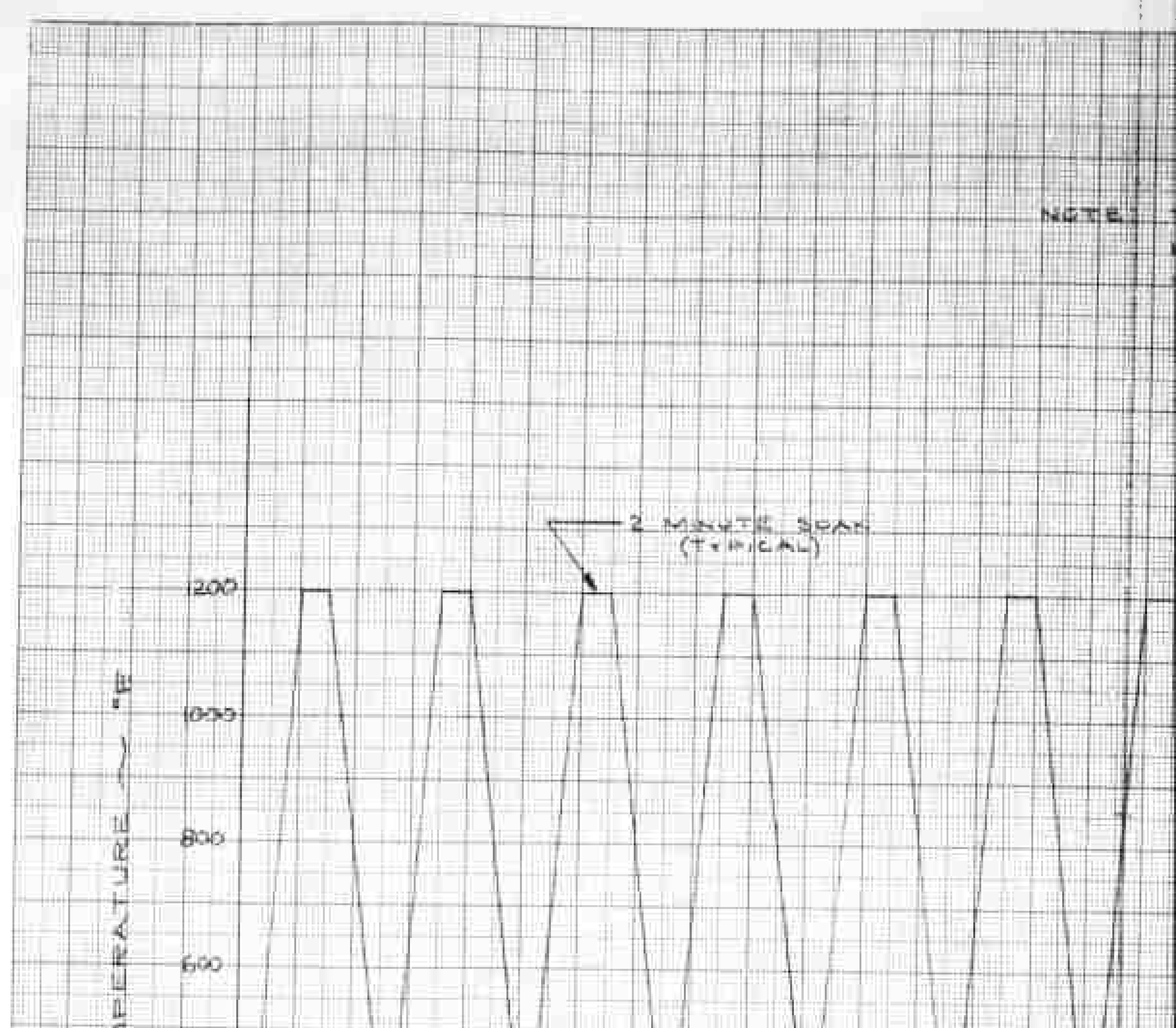
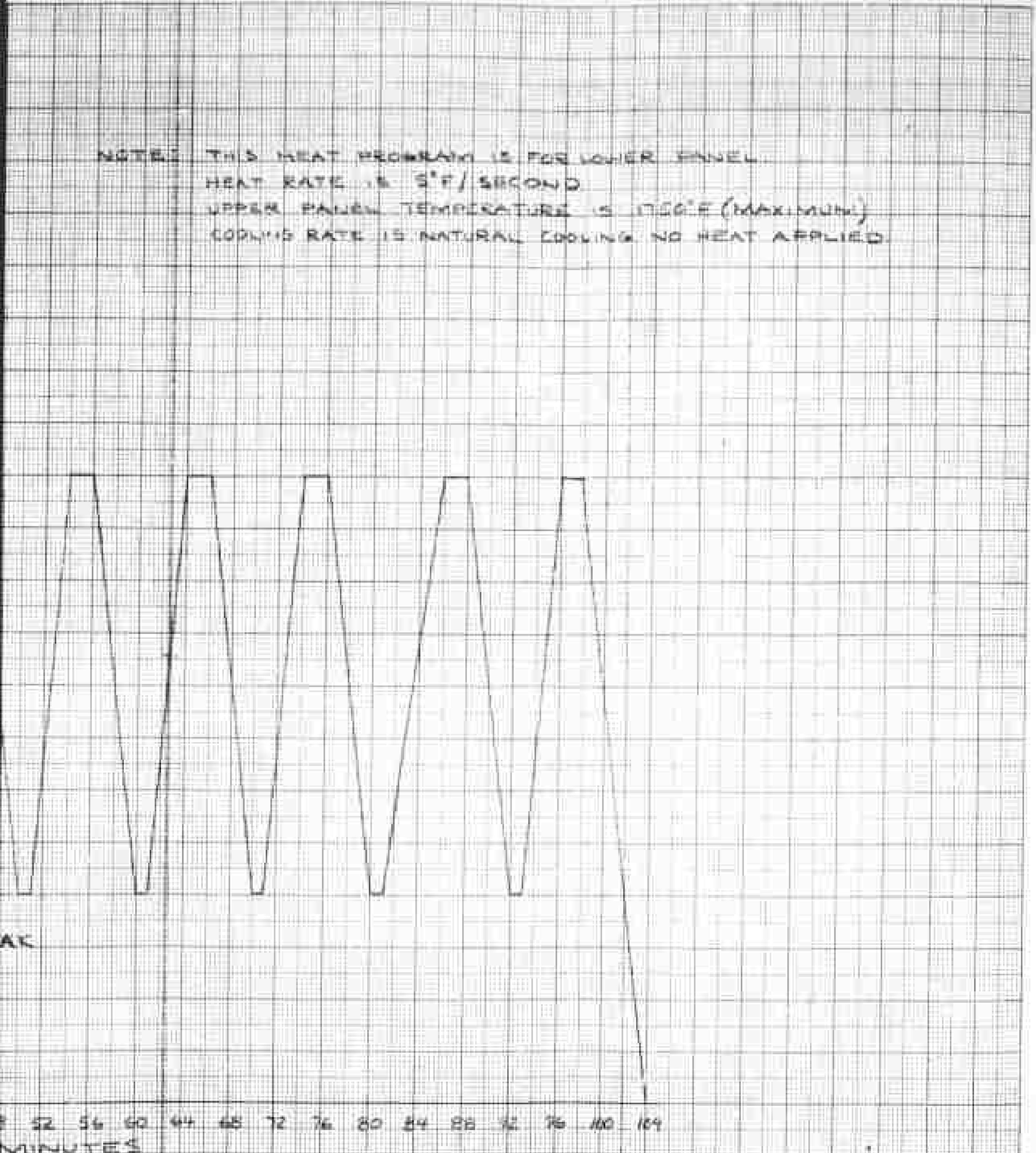
Fig. 30

2

K+E ALBANENE 1061


NOTE:
2 MINUTE SOAK (TYPICAL)
1 MINUTE SOAK (TYPICAL)
TEMPERATURE ~ °F
1200
1000
800
600
400
200
4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64
TIME ~ MINUTES

[redacted]



CALC	ED N	3-27-61	REVISED	DATE
CHECK				
APPR				
APPR				

PANEL ATTACHMENT
LT 5-593-2-3, -4, -5, -6

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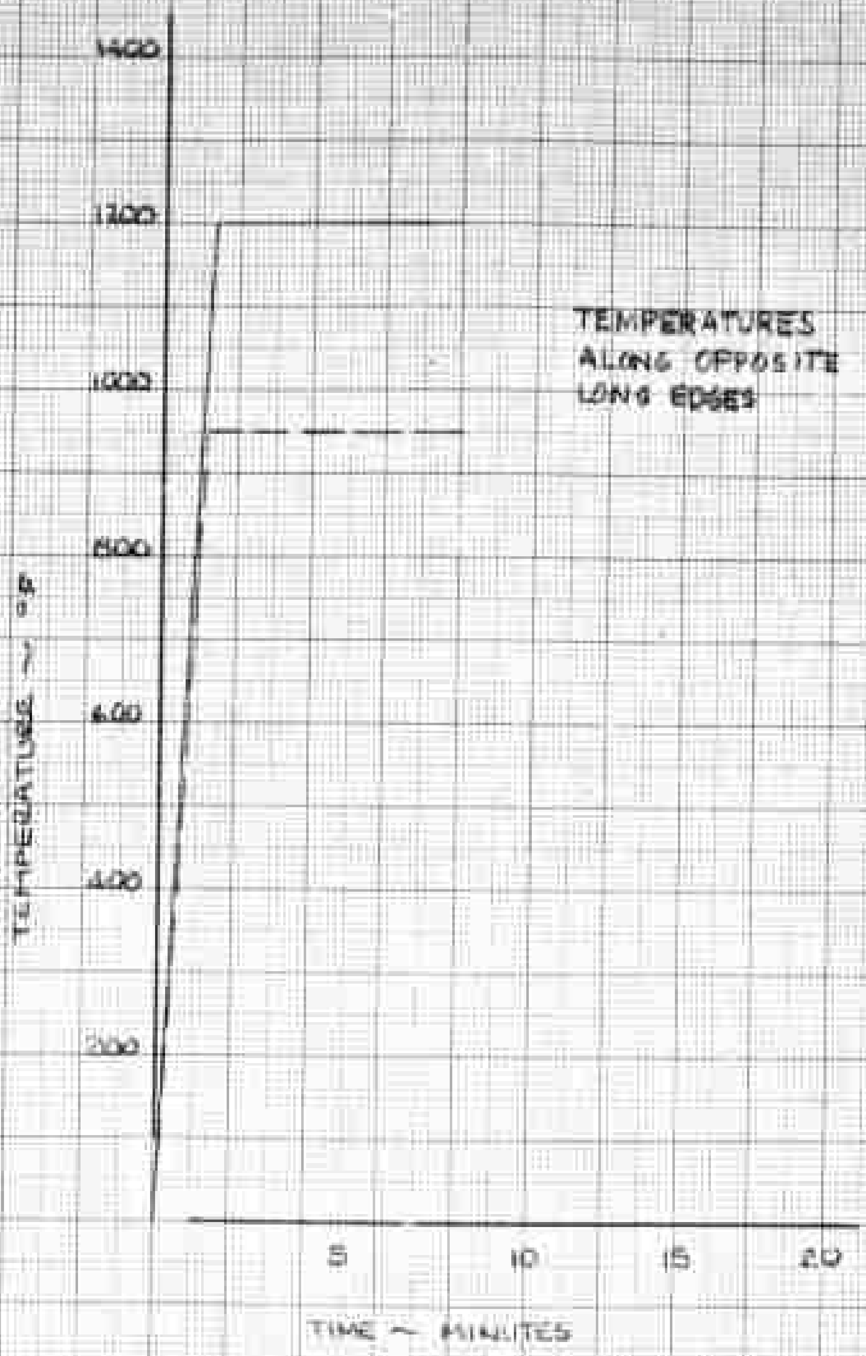
PAGE
Fig. 51

2

K&E ALBANENE TRACING PAPER



CALC	S. Reich	7-63	REVISED	DATE	HEATING PROGRAM
CHECK					LT-5593-2-6B
APR					D2-90084
APR					THE BOEING COMPANY
					PAGE Fig [illegible]

U3 4013 8000

K+E ALBANENE® 70737 TRACING PAPER

[illegible] 511

Total Test Time		Test Time	Freq.	Hot Gas Press	Sound Level	Panel Deflection Applied		Remarks
Hrs	Min	Min.	cps		db	Inches		
0	05	05	RANDOM		152			NO [illegible] FAILURE

PANEL [illegible] TO HEAT LAB FOR
15 MIN 2000° HEAT CYCLE

HEAT TEST CAUSED NUMEROUS [illegible] WELD FAILURES AND [illegible]. IN ADDITION, PANEL DISPLAYED GENERAL WAFFLE LIKE APPEARANCE AFTER TEST. FAILURES MARKED WITH PEN.

Total Test Time		Test Time	Freq.	Hot Gas Press	Sound Level	Panel Deflection Applied		Remarks
0	20	15			152			3 [illegible] SEAM [illegible] FAILURE (MARKED -1)
0	40	20			152			NEW [illegible] WELD, ONE NEW [illegible] (MARKED -2) (ON PANEL [illegible] WELD CRACK)
1	0	20			152			

CP 4/15/60

PANEL 1417
TEST LOG
EWA 5-593-1

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Vol. I

Total Test Time		Test Dura.	Freq.	Horn Control Press.	Sound Level	Panel Double Amplitude		Remarks
		Min	cps		db	inches		
Hr	Min	3	[illegible]	—	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]							

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Vol I

Total Test Time	Test Time	Freq.	Time Constant Time	Input Level	Crack Length Achieved		
	Min	cps		db	Inches		
0 15	5	[illegible]		[illegible]	—		[illegible]

PANEL [illegible] TO [illegible] THE [illegible] [illegible] HEAT CYCLE

[illegible] FAILURES AND [illegible].

[illegible] SAME

[illegible].

Total Test Time	Test Time	Freq.	Time Constant Time	Input Level	Crack Length Achieved		
0 20	15	RANDOM		150	—		[illegible] FAILURES MARKED.)
[illegible]				[illegible]	—		[illegible] FAILURE

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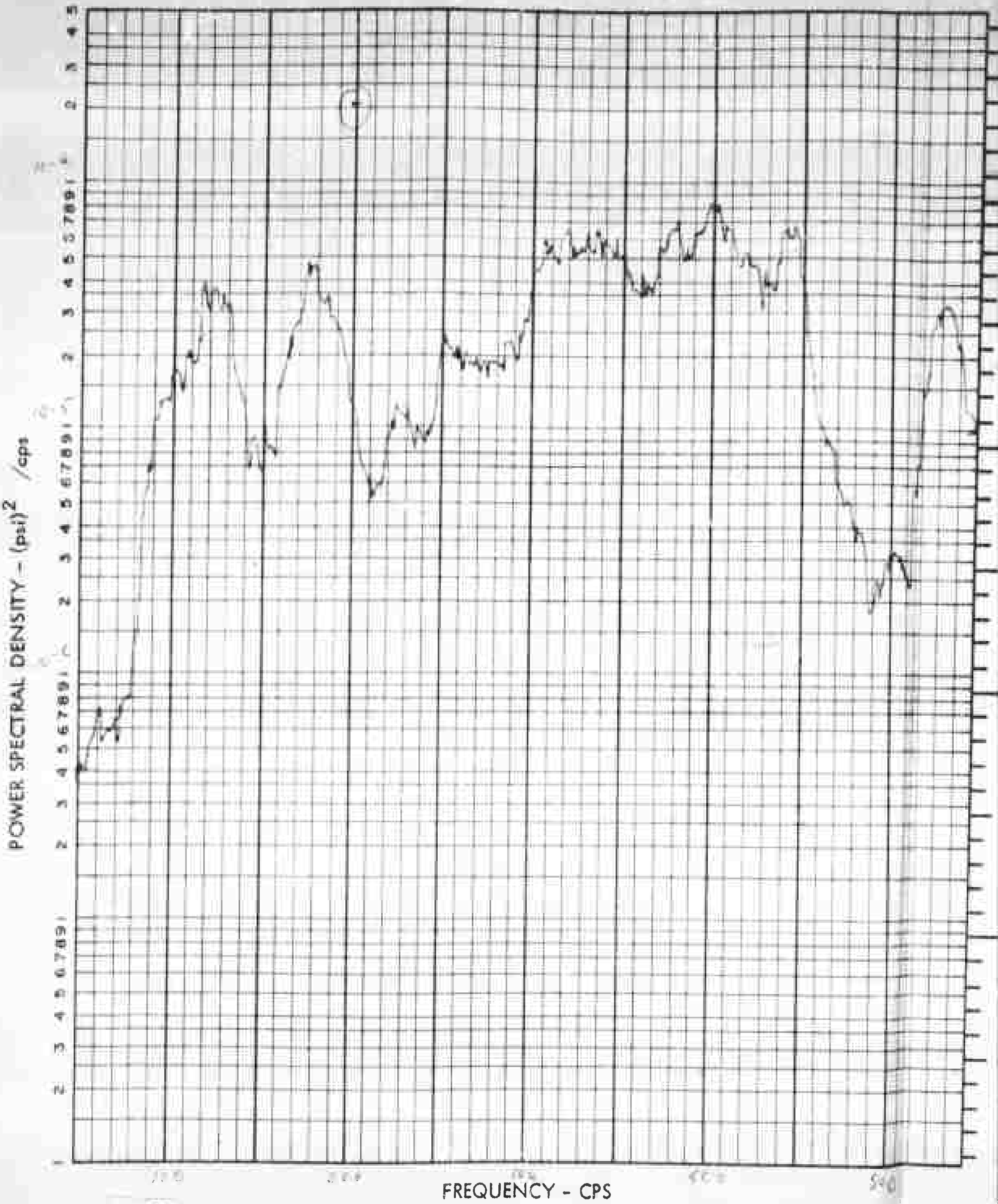
Vol I



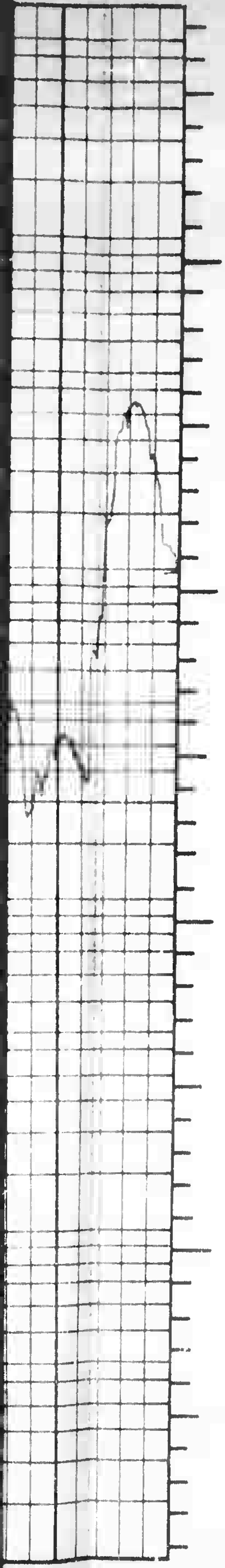
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps		T_c 4 Sec.	
___ cycles from ___ to ___ cps		Anal. Rate 12.5 cps/Sec.	
___ cycles from ___ to ___ cps		Loop Length 4 Sec.	

CALC
CHECK
APR.
APR.



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

500

2

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE 1		
EWA No.	Panel or Specimen No.	
Tape No.	Tape Channel 2	Mic. No.
Elapsed Test Time	Mic. RMS Level at Sonic Lab. $V_L =$ Volts	

CALIBRATION

Tape No.	Tape Channel	Data Tape RMS Volt $V_R =$
Calibration Voltage $V_a =$ V_{rms} into Line Amp.; $V_c =$ V_{rms} on Tape @ cps		
Line Amplifier Settings For Calibration $G_c =$; for Data $G_d =$		
Lab. Gain LG =	Tape Monitor Gain $TMG = \frac{G_d}{G_c} =$	
Microphone Sensitivity S = psi/Volt or 1 Volt rms = db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S =$		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 =$ psi^2/cps		
Analyzer Attenuator Setting db	Log Converter Setting db	
Calibration Plotted at psi^2/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{}{} =$ psi	Equiv. to db SPL	

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT
CHECK					1477 MIC NO 1
APR.					THE BOEING COMPANY
APR					

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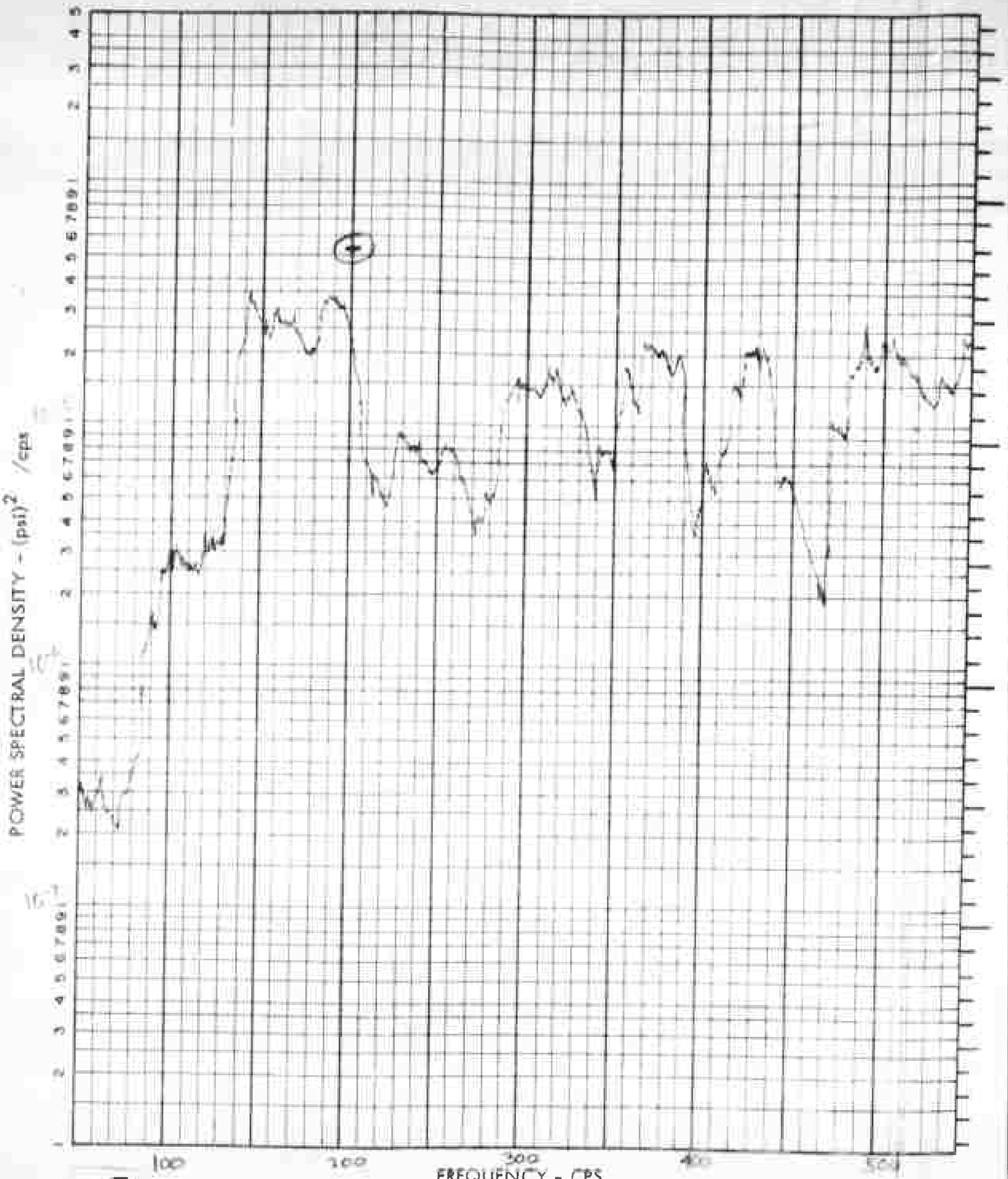


1

ANALYSIS VARIABLES

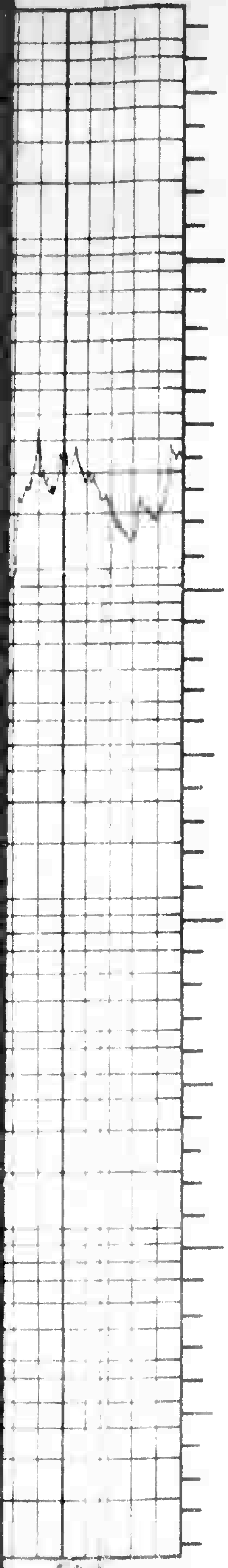
Bandwidth

5 cycles from 50 to 550 cps — T_e 4 Sec.

___ cycles from ___ to ___ cps — Anal. Rate 1.75 cps/Sec.

___ cycles from ___ to ___ cps — Loop Length 4 Sec.

CALC
CHECK
APR
APR



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM	
EWA No. 5503-1	Panel or Specimen No. 1477
Tape No. 11 / Tape Channel 3	Mic. No. 2
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 11	Tape Channel 1	Data Tape RMS Volt V_R = .350

Calibration Voltage
V_a = V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .2

Lab. Gain LG = 1 | Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .5 ... .145

Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{2 \times 1}\right]^2 = 5.26 \times 10^{-3} \text{ psi}^2/\text{cps}$$

Analyzer Attenuator Setting -20 db | Log Converter Setting db

Calibration Plotted at 5.26 × 10⁻⁵ psi²/cps

Overall Pressure Level Data | Equiv. to db SPL

RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ______ = psi

2

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1477 MIC No 2	VOL I
CHECK						D2 80084
APR					THE BOEING COMPANY	PAGE FIG 97
APR						

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_e 4 Sec.

Anal. Rate 1.25 cps sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1977	
Tape No. 11	Tape Channel 4	Displacement Pickup # 1
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 11	Tape Channel 1	Data Tape RMS Volt V_R =
Calibration Voltage V_a = V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .2		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (0.5) (.0708) 0.0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{0.0354}{(2)(1)}\right]^2 = 3.13 \times 10^{-4}$ in.^{2}/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting db	
Calibration Plotted at 3.13×10^{-6} in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ______ = psi		

2

500

			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	Vol. I
CALC						
CHECK						D2-90084
APR					1977 P/U No 1	
APR					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE Fig 38

1

ANALYSIS VARIABLES

Bandwidth
5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 9 Sec.
Anal. Rate 1.25 cps/sec.
Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1477	
Tape No. 11	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 11	Tape Channel 1	Data Tape RMS Volt V_R = 0.215

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1

Displacement Pickup Sensitivity
S = .0708 in./Volt

Equivalent of Calibration ~ in.
$D_c = V_a \cdot S$ = (.5)(.0708) .0354

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1}\right]^2 \quad 1.25 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting -10 db	Log Converter Setting db

Calibration Plotted at in.^{2}/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$$
$$= \underline{\qquad\qquad} = \quad \text{psi}$$

2

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
CHECK					1477 P/U no. 5
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON
APR.					

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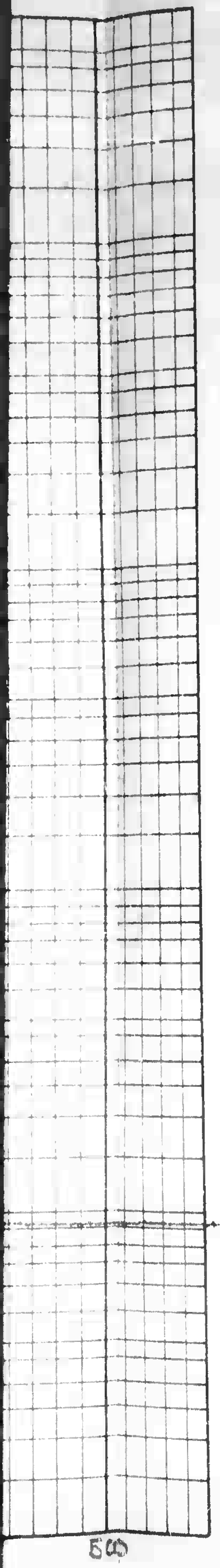
1

ANALYSIS VARIABLES

Bandwidth
5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/sec.
Loop Length 4 Sec.



DATA IDENTIFICATION

Test Title . PANEL ATTACH TYPE I PRELIM	
EWA No. 5593-1	Panel or Specimen No. 1477

Tape No. 11	Tape Channel 6	Displacement Pickup # 6

Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 11	Tape Channel 1	Data Tape RMS Volt V_R = .245

Calibration Voltage
V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1

Displacement Pickup Sensitivity
S = .0708 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = (.5)(.0708) .0354

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting -10 db	Log Converter Setting db

Calibration Plotted at in.^{2}/cps

Overall Deflection Level of Data
RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$

= ______ = psi

2

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	Vol. I
CHECK	RGS				1477 P/U 6	D2-80084
APR					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG. 100
APR						

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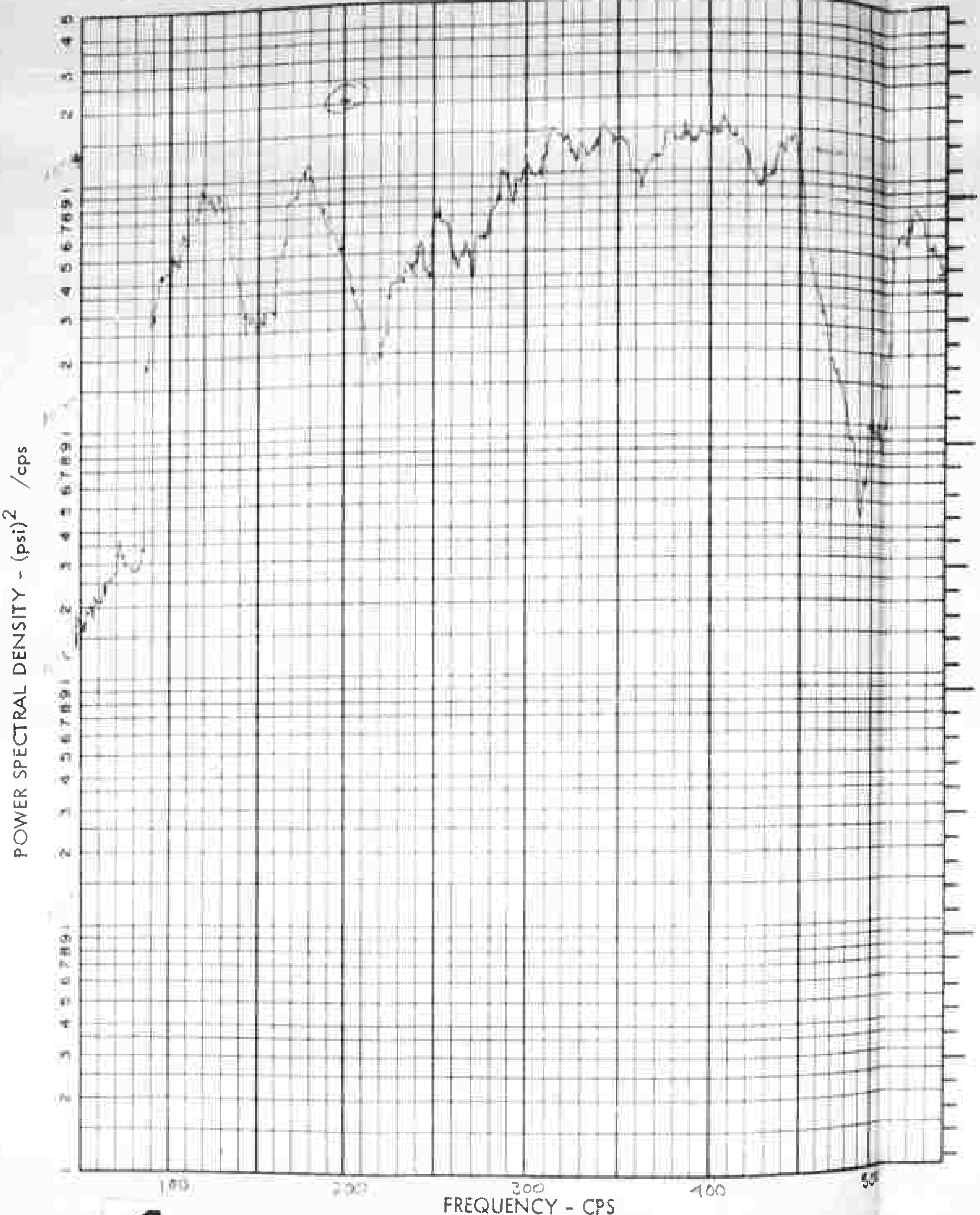


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

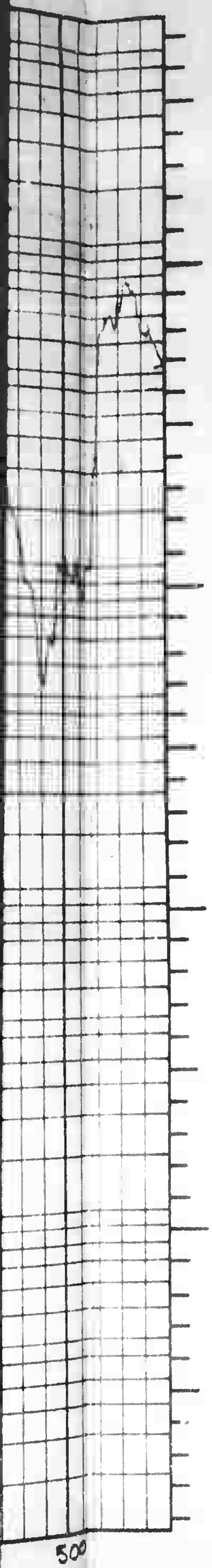
___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/Sec.

Loop Length 9 Sec.

CALC	
CHECK	
APR.	
APR	



SPECTRUM LEVEL – DECIBELS (Re 0.0002 Microbar)

2

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM.	
EWA No.: 5593-1	Panel or Specimen No.: 1478

Tape No.: 12	Tape Channel: 2	Mic. No.: 1

Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No.: 12	Tape Channel: 2	Data Tape RMS Volt V_R = .

Calibration Voltage
V_a = V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration – psi
$P_c = V_a \cdot S = (.5)(.290)$ 0.145

Equivalent of Calibration for PSD Plots
$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{1 \times 1}\right]^2 = 2.10 \times 10^{-2}$ psi^2/cps

Analyzer Attenuator Setting −20 db	Log Converter Setting db

Calibration Plotted at psi^2/cps

Overall Pressure Level Data	Equiv. to db SPL

RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$

= ———— = psi

CALC		REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT
CHECK				1478 Mic 1
APR.				THE BOEING COMPANY
APR				PAGE

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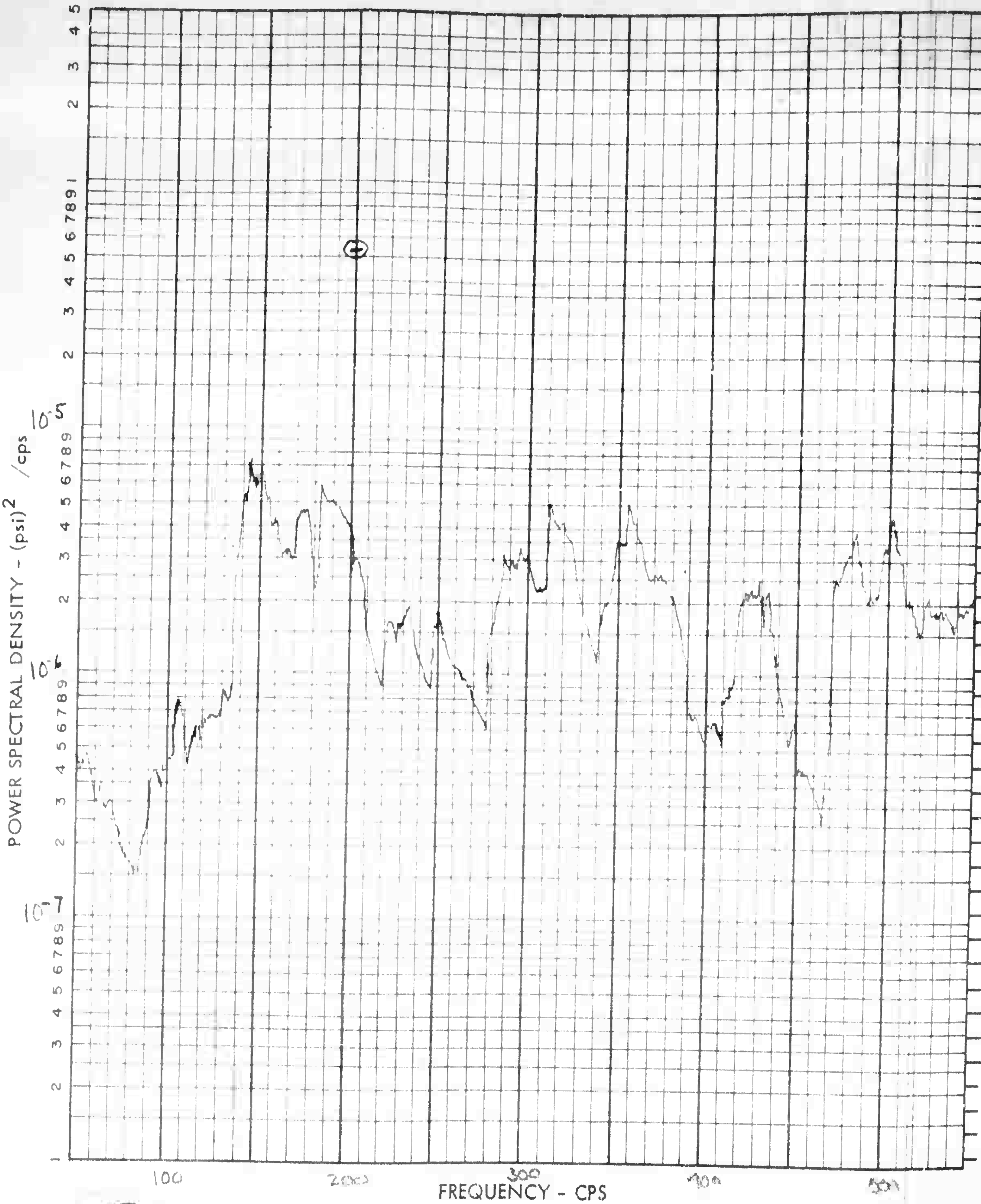


1

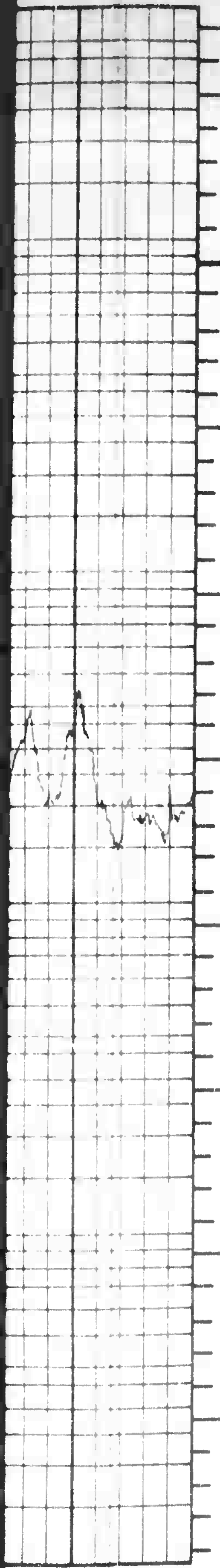
ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/Sec.
Loop Length 4 Sec.

CALC
CHECK
APR.
APR.



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

2

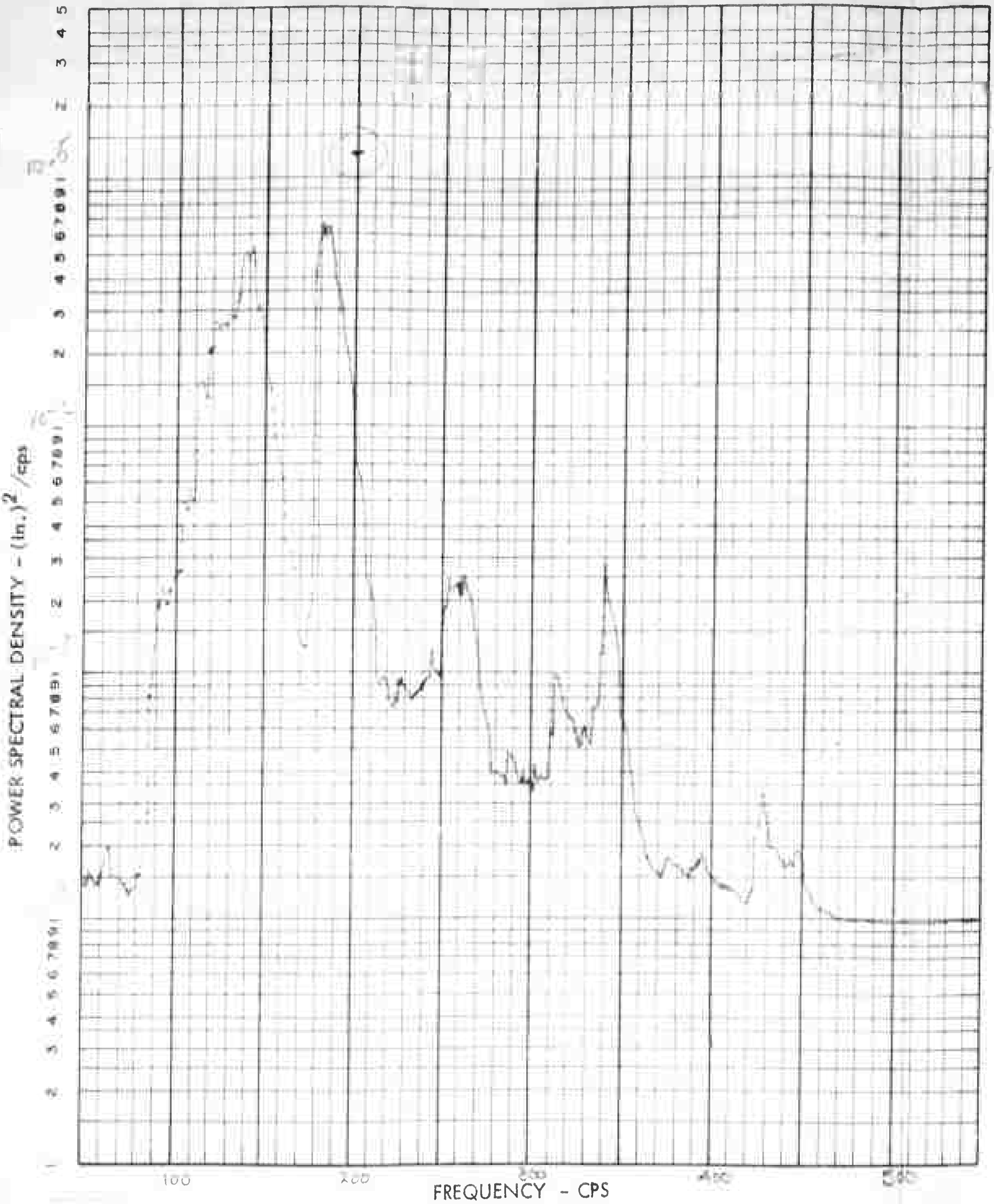
DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1478	
Tape No. 12	Tape Channel 3	Mic. No. 2
Elapsed Test Time	Mic. RMS Level at Sonic Lab. $V_L =$ Volts	

CALIBRATION

Tape No. 12	Tape Channel 1	Data Tape RMS Volt $V_R =$
Calibration Voltage $V_a = .5\ V_{rms}$ into Line Amp.; $V_c = .5\ V_{rms}$ on Tape @ 200 cps		
Line Amplifier Settings For Calibration $G_c = .1$; for Data $G_d = .2$		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 2$	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S = (.5)(.290) = .145$		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{2 \times 1}\right]^2 = 5.26 \times 10^{-3}$ psi^2/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting db	
Calibration Plotted at 5.26×10^{-5} psi^2/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \_\_\_\_ =$ psi	Equiv. to db SPL	

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1478 MIC 2	VOL 1
CHECK	RLE	10-1-3				D2 80084
APR.					THE BOEING COMPANY	PAGE FIG 102
APR.						



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 9 Sec.

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM		
EWA No.: 5593-1	Panel or Specimen No.: 1478	
Tape No.: 12	Tape Channel: 4	Displacement Pickup #: 1
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No.: 12	Tape Channel: 1	Data Tape RMS Volt V_R = 0.175
Calibration Voltage V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0708) .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{(1)(1)}\right]$ 1.25×10^{-3} in.^{2}/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting db	
Calibration Plotted at in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$ $= \_\_\_\_ =$ psi		

2

500

CALC			REVISED	DATE
CHECK	ROC	10-23		
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APR.				

POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP

1478 P/U 1

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1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM.		
EWA No. 5593-1	Panel or Specimen No. 1478	
Tape No. 12	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 12	Tape Channel 1	Data Tape RMS Volt V_R =
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape 200cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain TMG = $\frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5) .0708 .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3}$ in.²/cps		
Analyzer Attenuator Setting -10 db	Log Converter Setting db	
Calibration Plotted at in.²/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ______ = psi		

2

500

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
CHECK	RDS	10-2-3			1478 P/U 5
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON
APR					

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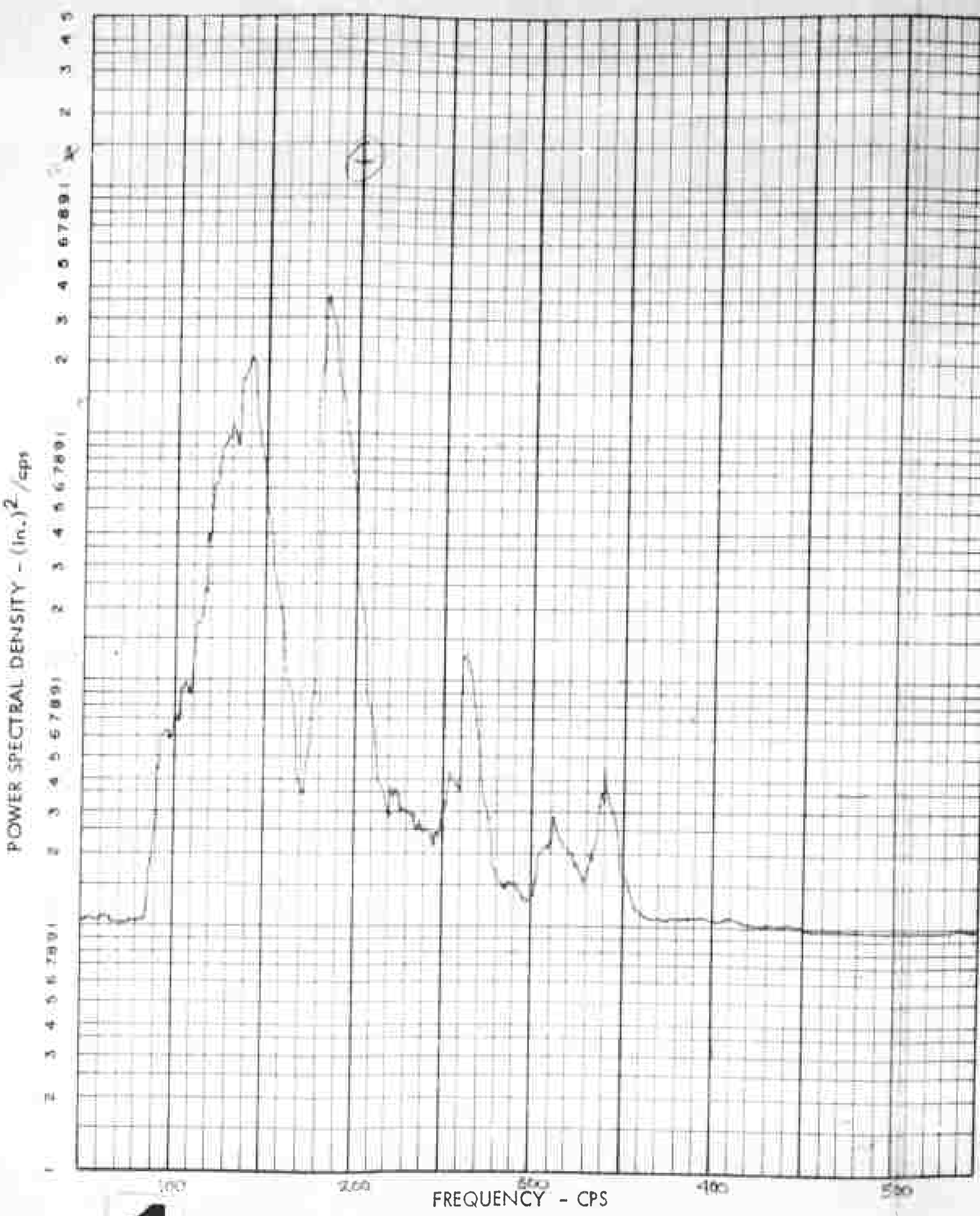


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

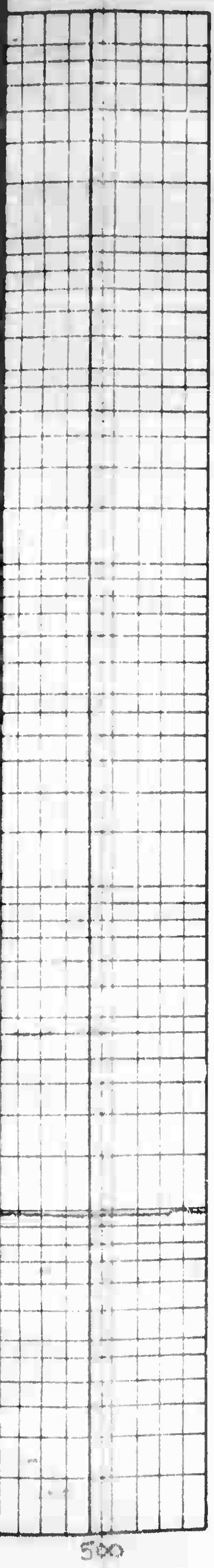
___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.



DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 55	Panel or Specimen No. 1478	
Tape No. 12	Tape Channel 6	Displacement Pickup # 6
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 12	Tape Channel 1	Data Tape RMS Volt V_R = .230
Calibration Voltage V_a = .5 V_{rms} Into Line Amp.; V_c = 5 V_{rms} on Tape 200cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0708) = .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = $\left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting −10 db	Log Converter Setting db	
Calibration Plotted at in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ________ = psi		

2

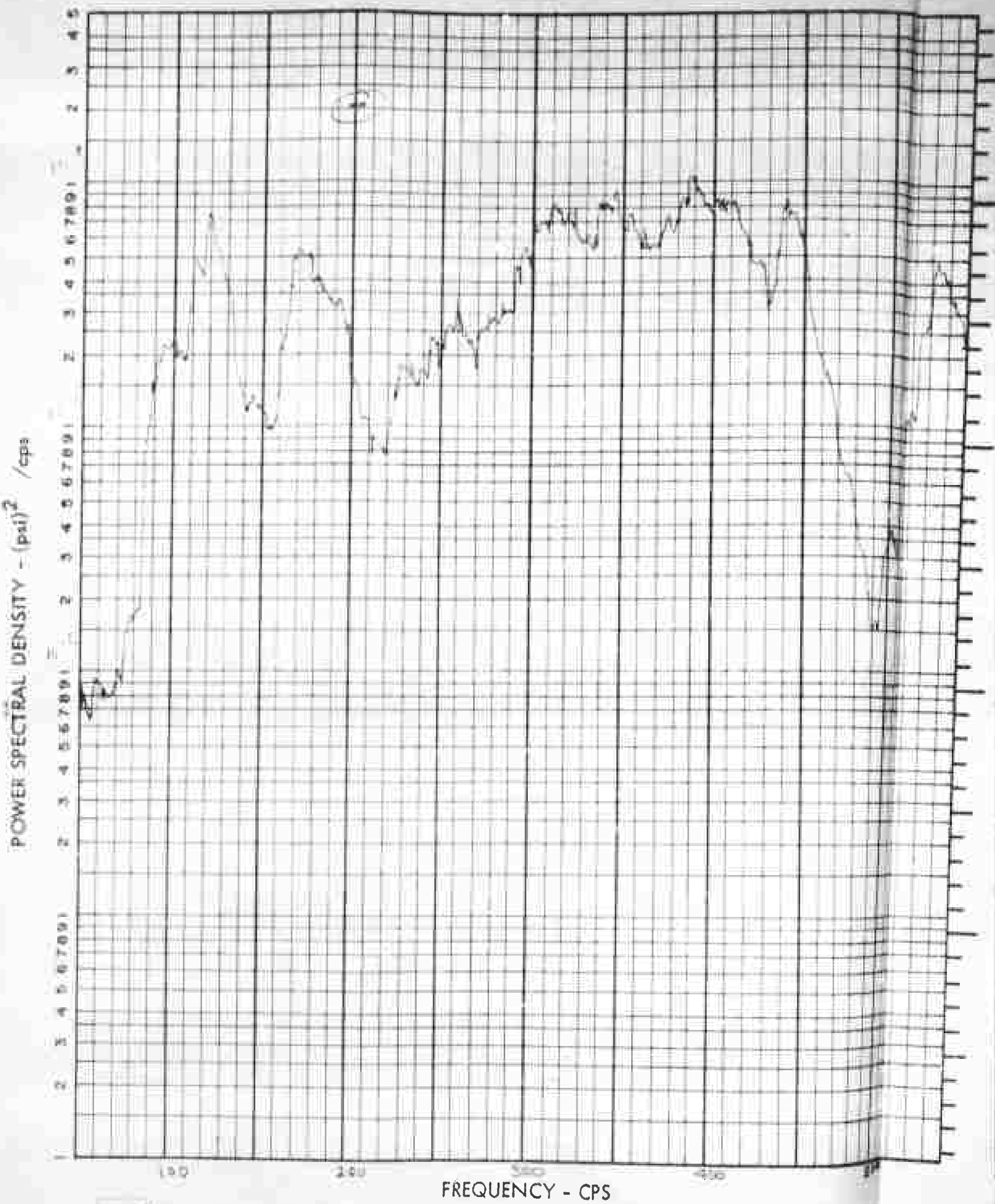
CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
CHECK	RDS	10-?			1478 P/U 6
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON
APR.					

Va I

D2-80084

PAGE Fig 105

2-5353-4-38



1

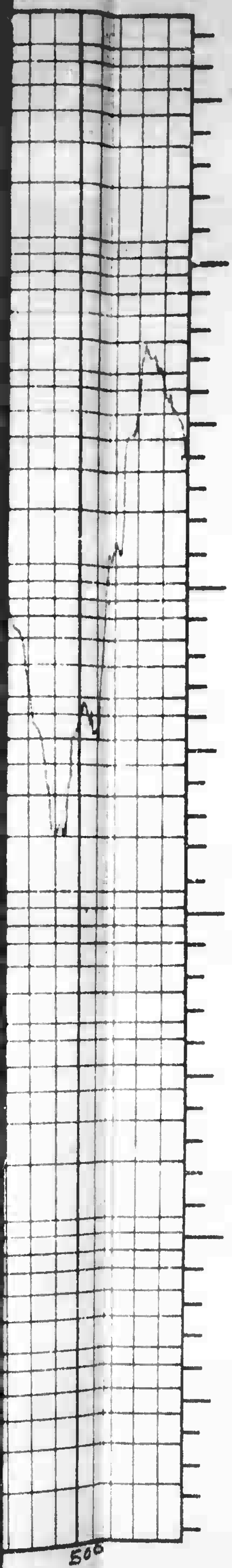
ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/Sec.
Loop Length 4 Sec.

CALC	
CHECK	[illegible]
APR.	
APR.	



DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 13	Tape Channel 2	Mic. No. 1
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

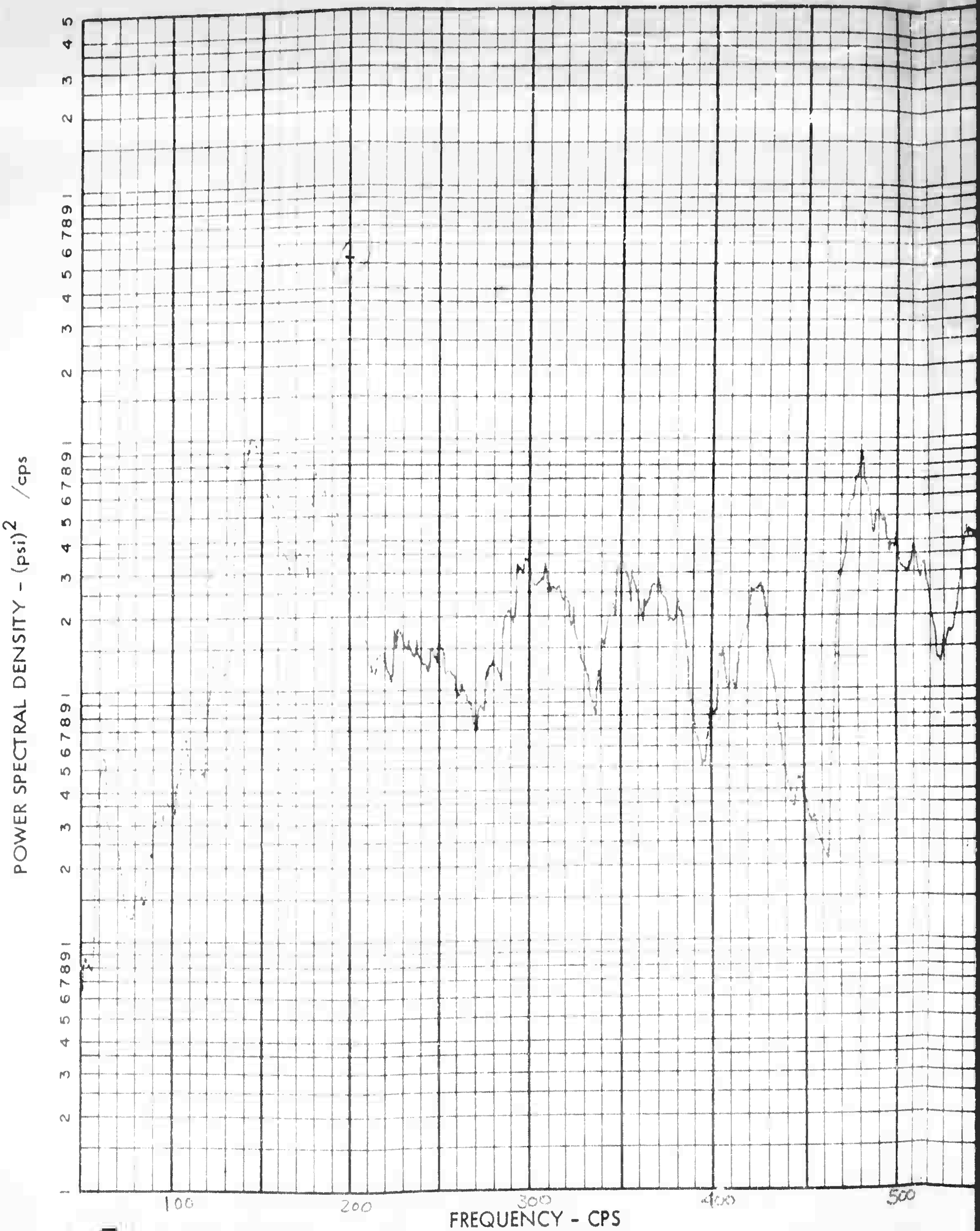
Tape No. 13	Tape Channel 1	Data Tape RMS Volt V_R =
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = (.5)(.290) .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{1 \times 1}\right]^2$ 2.10 × 10^{-2} psi^2/cps		
Analyzer Attenuator Setting db	Log Converter Setting db	
Calibration Plotted at psi^2/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ____ = psi	Equiv. to db SPL	

2

CALC	RES		REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT
CHECK	RDS				1479 MIC 1
APR.					THE BOEING COMPANY
APR.					

Vol I
D2-80084
PAGE FIG 106

2-5353-4-35

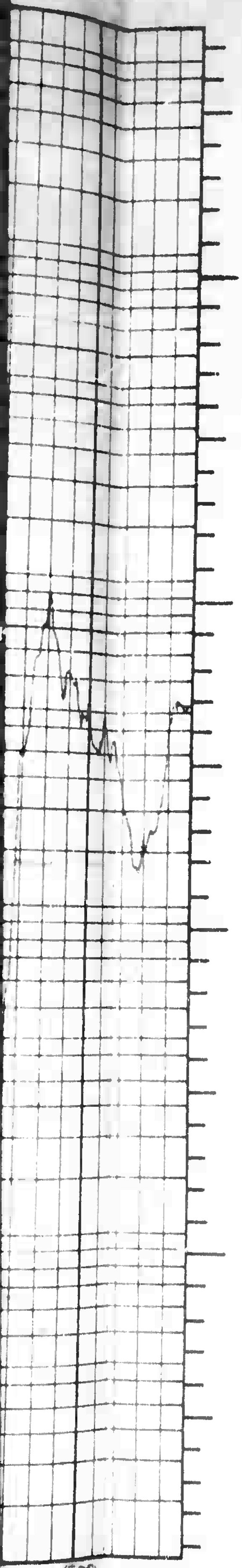


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 4 Sec.
___ cycles from ___ to ___ cps   Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps   Loop Length 4 Sec.



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 13	Tape Channel 3	Mic. No. 2
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 13	Tape Channel 1	Data Tape RMS Volt V_R =
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = 5 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .2		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = (.5)(.290) .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{2\times1}\right]^2 = 5.26\times10^{-3}$ psi^2/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting db	
Calibration Plotted at psi^2/cps		
Overall Pressure Level Data RMS Pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ——— = psi	Equiv. to db SPL	

2

CALC	RFS	9/...	REVISED	DATE
CHECK	RDS	10...		
APR.				
APR				

POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT

1479 MIC 2

THE BOEING COMPANY

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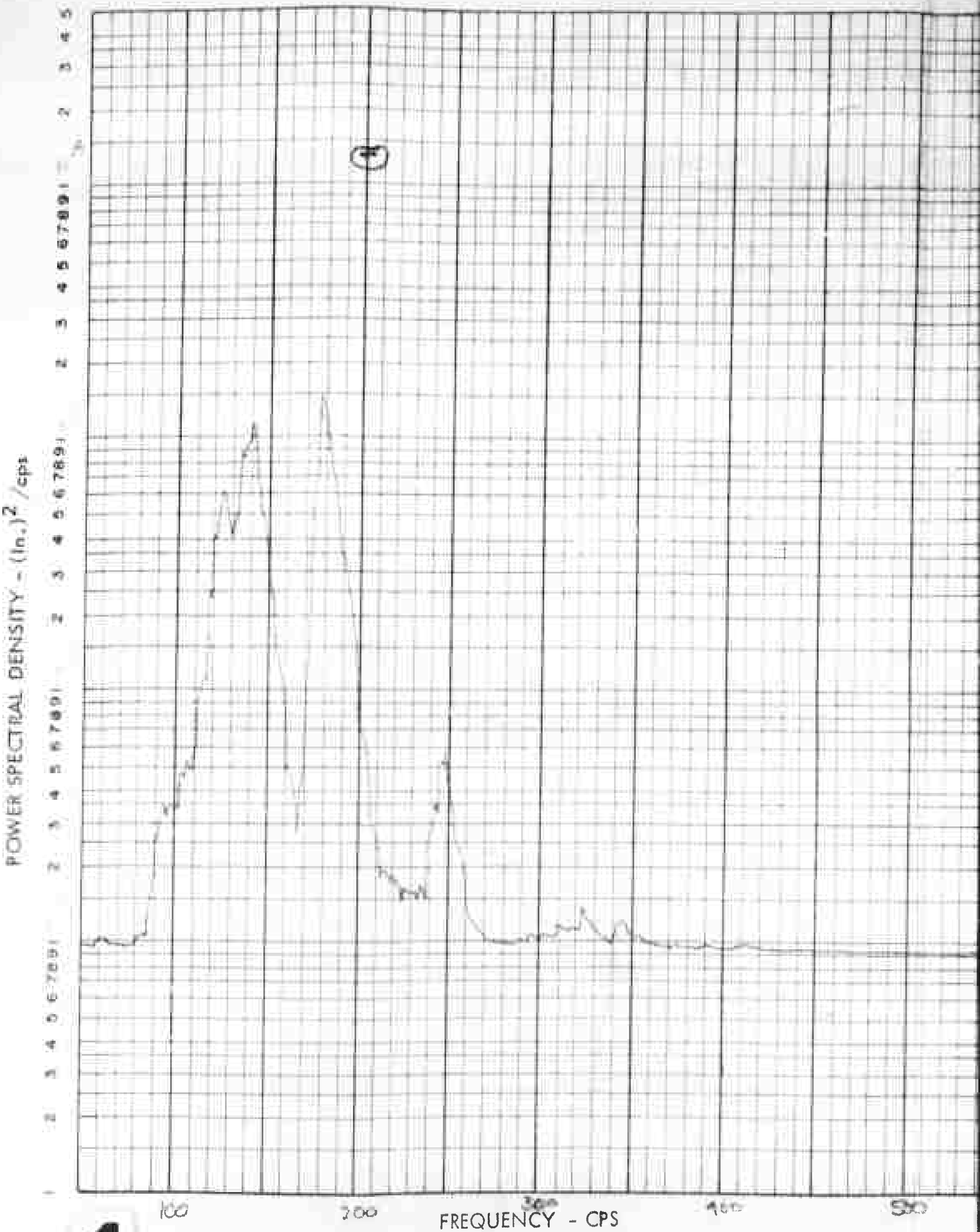
D2-80094

PAGE FIG 107



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_e 4 Sec.
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps	Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5598-1	Panel or Specimen No. 1479	
Tape No. 13	Tape Channel 4	Displacement Pickup 1
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 13	Tape Channel 1	Data Tape RMS Volt V_R = 0.230
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0708) = .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1}\right]^2 = 1.25 \times 10$ in.²/cps		
Analyzer Attenuator Setting -10 db	Log Converter Setting db	
Calibration Plotted at 1.25×10^{-1} in.²/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$ = ______ = psi		

500

2

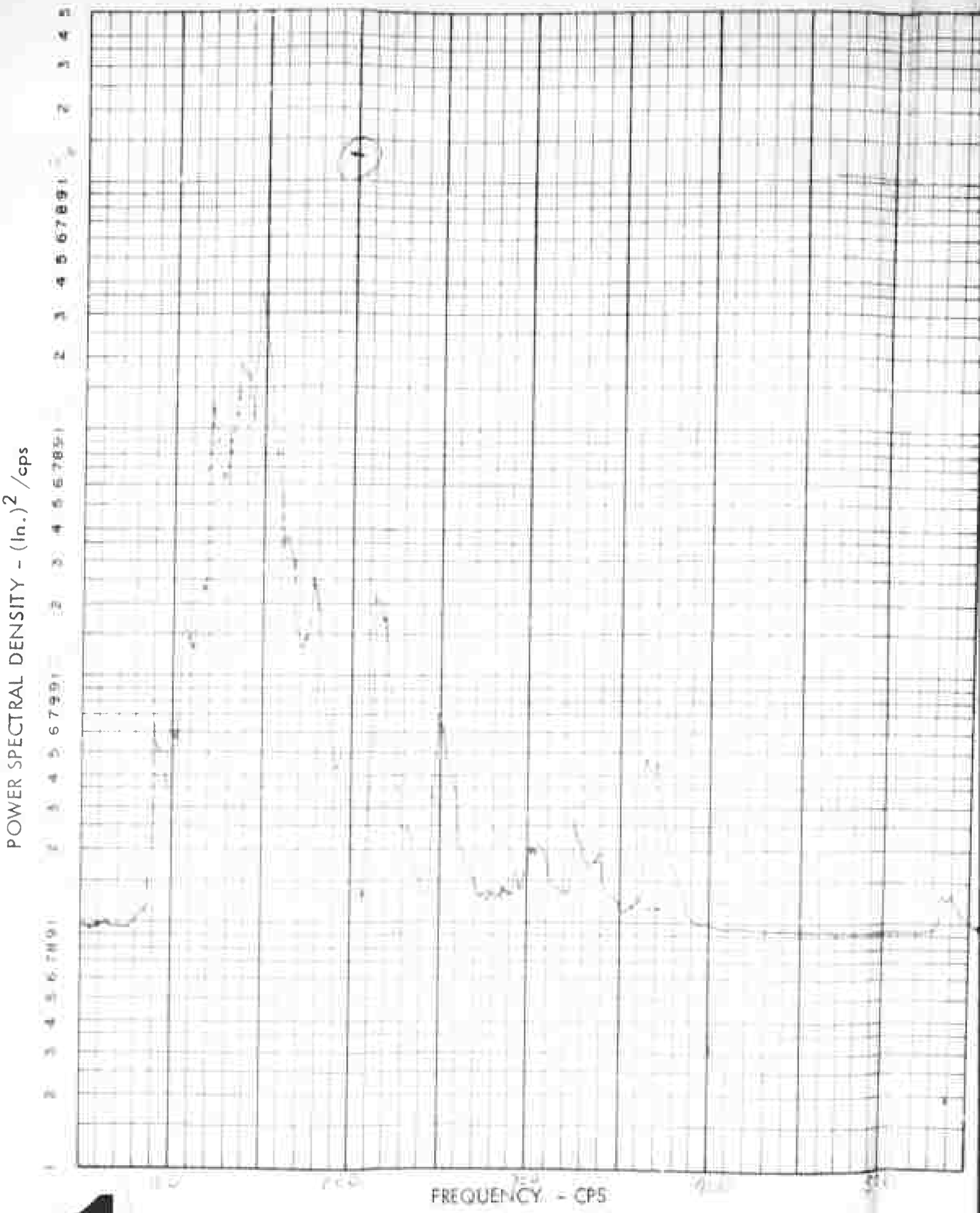
CALC		REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
CHECK	RDS			1479 P/U 1
APR.				THE BOEING COMPANY SEATTLE 24, WASHINGTON
APR				

VOL I

D2-80014

PAGE FIG 108

2-5353-4-38



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to [illegible] cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_e 4 Sec.
Anal. Rate [illegible] cps/sec.
Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE 1 PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 13	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 13	Tape Channel 1	Data Tape RMS Volt V_R = [illegible]

Calibration Voltage
V_a = V_{rms} Into Line Amp.; V_c = [illegible] V_{rms} on Tape [illegible] cps

Line Amplifier Settings
For Calibration G_c = [illegible] ; for Data G_d = [illegible]

Lab. Gain LG = 1 | Tape Monitor Gain $TMG = \frac{G_d}{G_c} =$ 1

Displacement Pickup Sensitivity
S = [illegible] in./Volt

Equivalent of Calibration - In.
$D_c = V_a \cdot S =$ [illegible] 4

Equivalent of Calibration for PSD Plots

$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\text{[illegible]} \right)^2 = \text{[illegible]} \times \text{[illegible]} \ \text{in.}^2/\text{cps}$$

Analyzer Attenuator Setting [illegible] db | Log Converter Setting db

Calibration Plotted at [illegible] $^{-4}$ In.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$$

______________ = psi

2

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	Vol I
CHECK					1479 P/U 5	D2 [illegible]
APR					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG 109
APR						

2-5353-4-38

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_e = 1 Sec.

Angl. Rate 1.25 cps/sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH. TYPE I PRELIM.		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 13	Tape Channel 6	Displacement Pickup 6
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

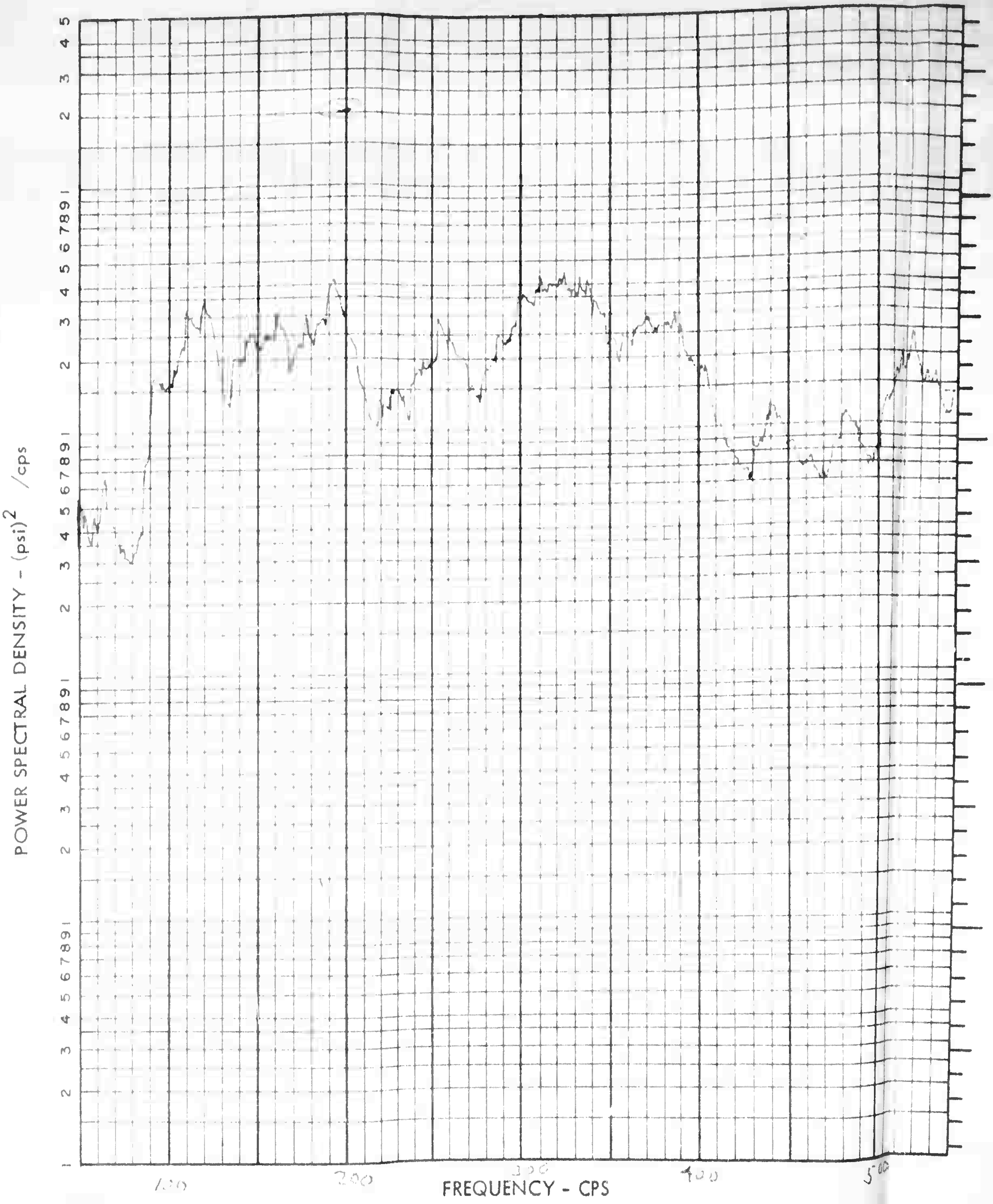
Tape No. 13	Tape Channel 1	Data Tape RMS Volt V_R = 0.3[illegible]
Calibration Voltage V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain TMG = $\frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0708) = .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1\times1}\right]^2$ = 1.25×10[illegible] in.^{2}/cps		
Analyzer Attenuator Setting [illegible] db	Log Converter Setting db	
Calibration Plotted at 2 [illegible] in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ______ = psi		

2

500

CALC	RFS	[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
CHECK	RDS	[illegible]			VOL I
APR					1419 P/U 6 — D2-80084
APR					THE BOEING COMPANY SEATTLE 24, WASHINGTON — PAGE FIG 110

2-5353-4-38



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/Sec.

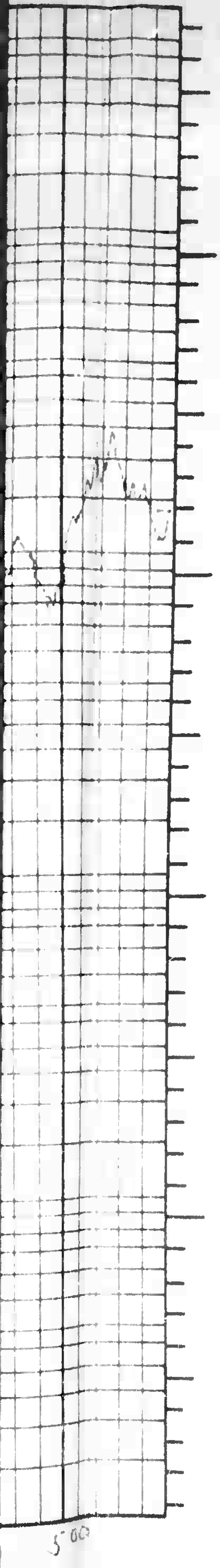
Loop Length 4 Sec.

CALC

CHECK

APR.

APR.



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

2

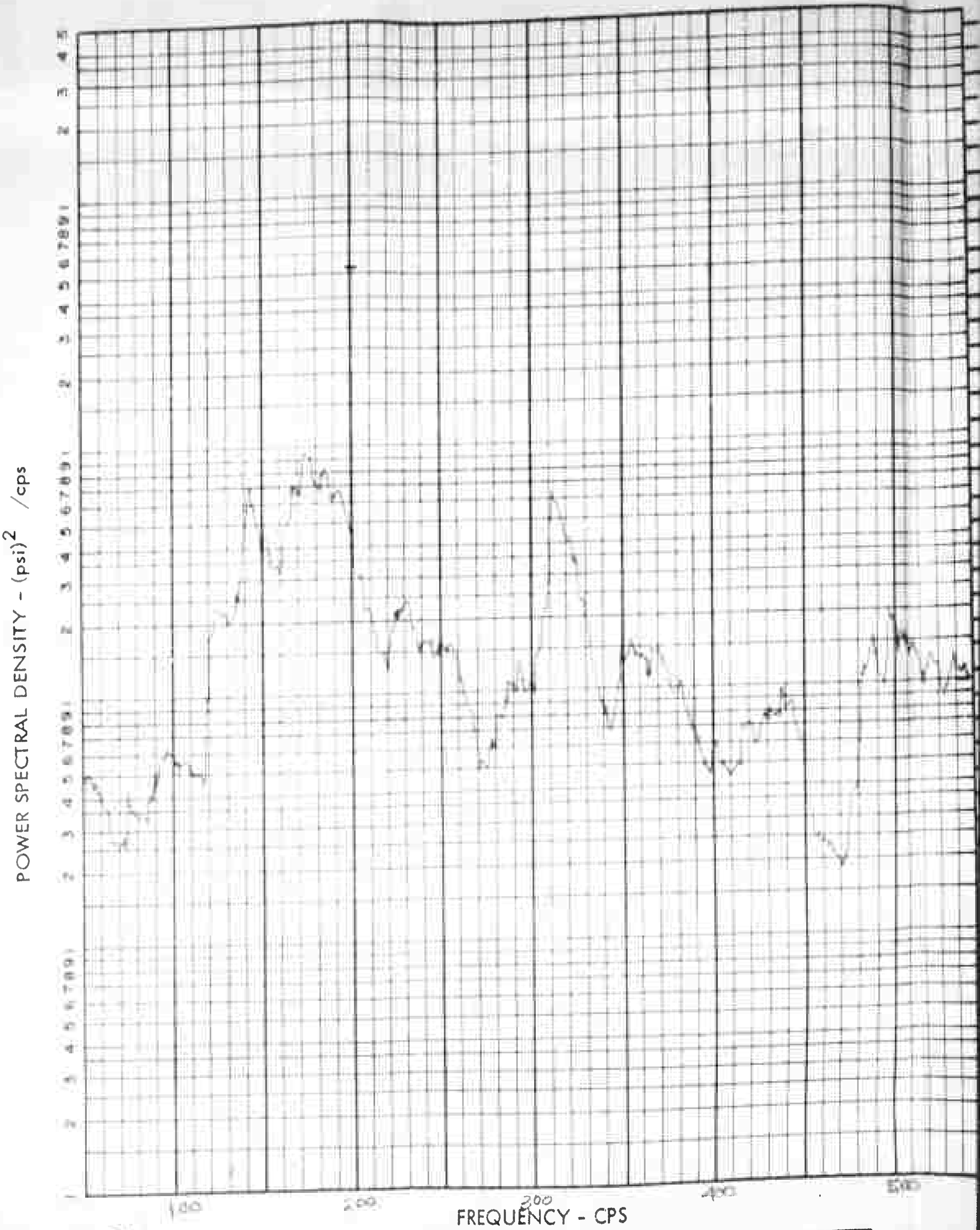
DATA IDENTIFICATION

Test Title: PANEL ATTCH TYPE I PRELIM.		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 14	Tape Channel 2	Mic. No. 1
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 14	Tape Channel 1	Data Tape RMS Volt V_R = 380
Calibration Voltage V_a = V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .1; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = (.5)(.290) = .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{1 \times 1}\right]^2 = 2.10 \times 10^{-2}$ psi²/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting 0 db	
Calibration Plotted at 2.10 × 10⁻⁴ psi²/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ——— = psi	Equiv. to db SPL	

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1479 MIC 1	VOL I
CHECK	KLS					D2 80084
APR.					THE BOEING COMPANY	PAGE FIG 111
APR						



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

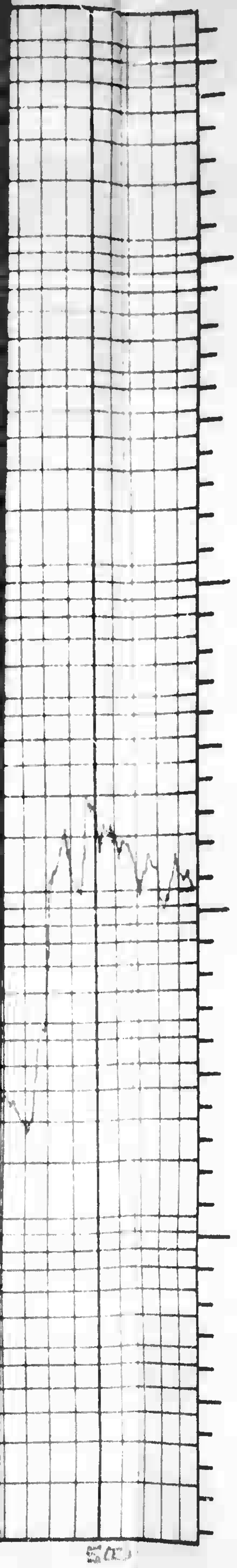
___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/Sec.

Loop Length 4 Sec.



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM.	
EWA No. 5593-1	Panel or Specimen No. 1479
Tape No. 14 / Tape Channel 3	Mic. No. 2
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 14 | Tape Channel 1 | Data Tape RMS Volt V_R = .220

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .2

Lab. Gain LG = 1 | Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = (.5)(.290) = .145

Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)\,(LG)}\right)^2 = \left[\frac{.145}{2 \times 1}\right]^2 = 5.26 \times 10^{-3} \text{ psi}^2/\text{cps}$$

Analyzer Attenuator Setting 20 db | Log Converter Setting 0 db

Calibration Plotted at 5.26 x 10^-3 psi²/cps

Overall Pressure Level Data | Equiv. to db SPL
RMS pressure Level $\frac{(P_c)\,(V_R)}{(TMG)(LG)(V_c)}$ = ———— = psi

2

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CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT	VOL I
CHECK	RLS				1479 MIC 2	D2 80037
APR.					THE BOEING COMPANY	PAGE FIG 112
APR						

2-5353-4-35

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 14	Tape Channel 4	Displacement Pickup # 1
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

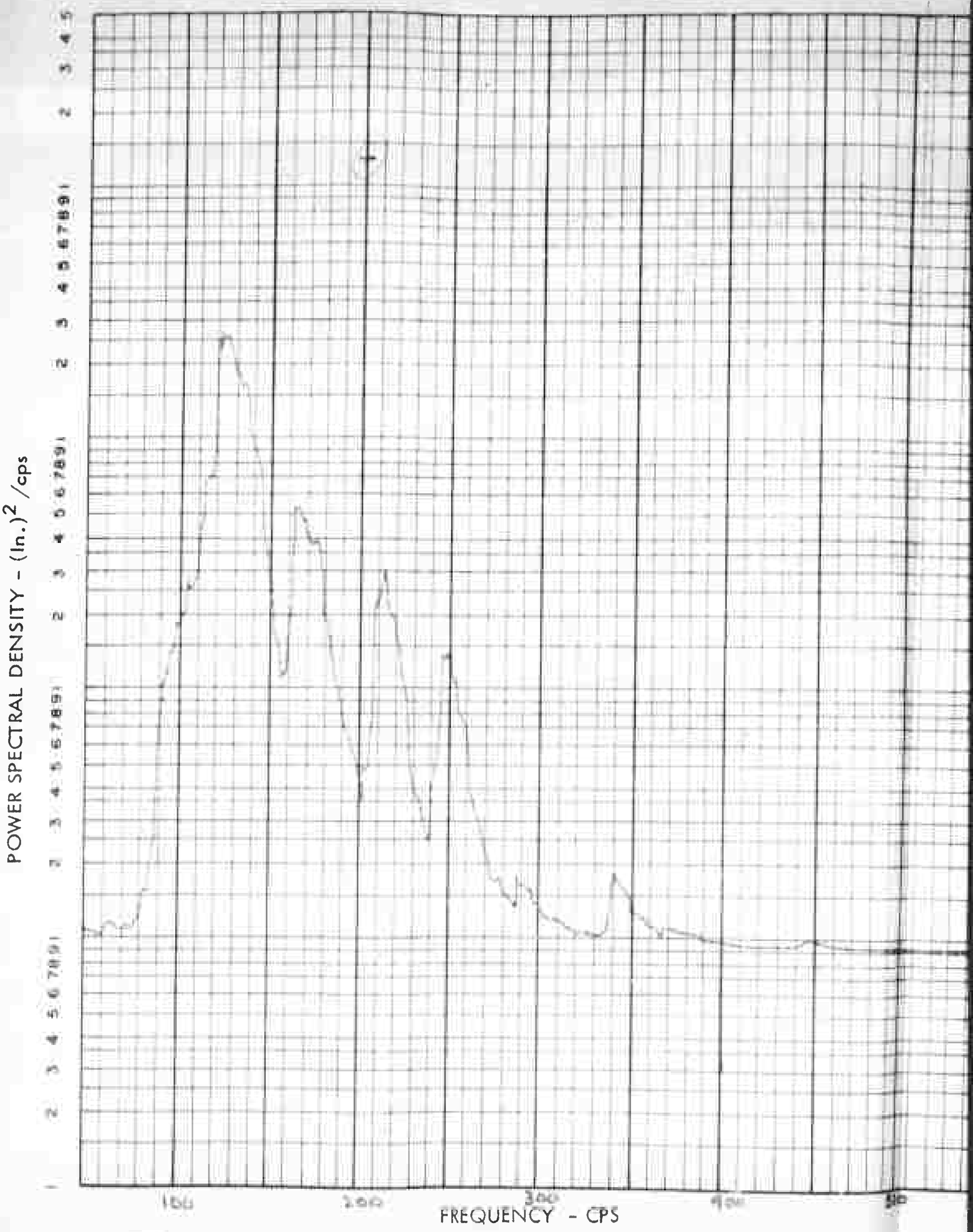
CALIBRATION

Tape No. 14	Tape Channel 1	Data Tape RMS Volt V_R =
Calibration Voltage V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain TMG = $\frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0708) = .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting -10 db	Log Converter Setting db	
Calibration Plotted at 1.25 × 10^{-3} in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ______ = psi		

2

CALC	KFS	9-1-63	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CHECK	RDS	10-63			1479 P/U 1	D2-8008
APR					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG 113
APR						

2-5353-4-38



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_c 4 Sec.
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps	Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 14	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

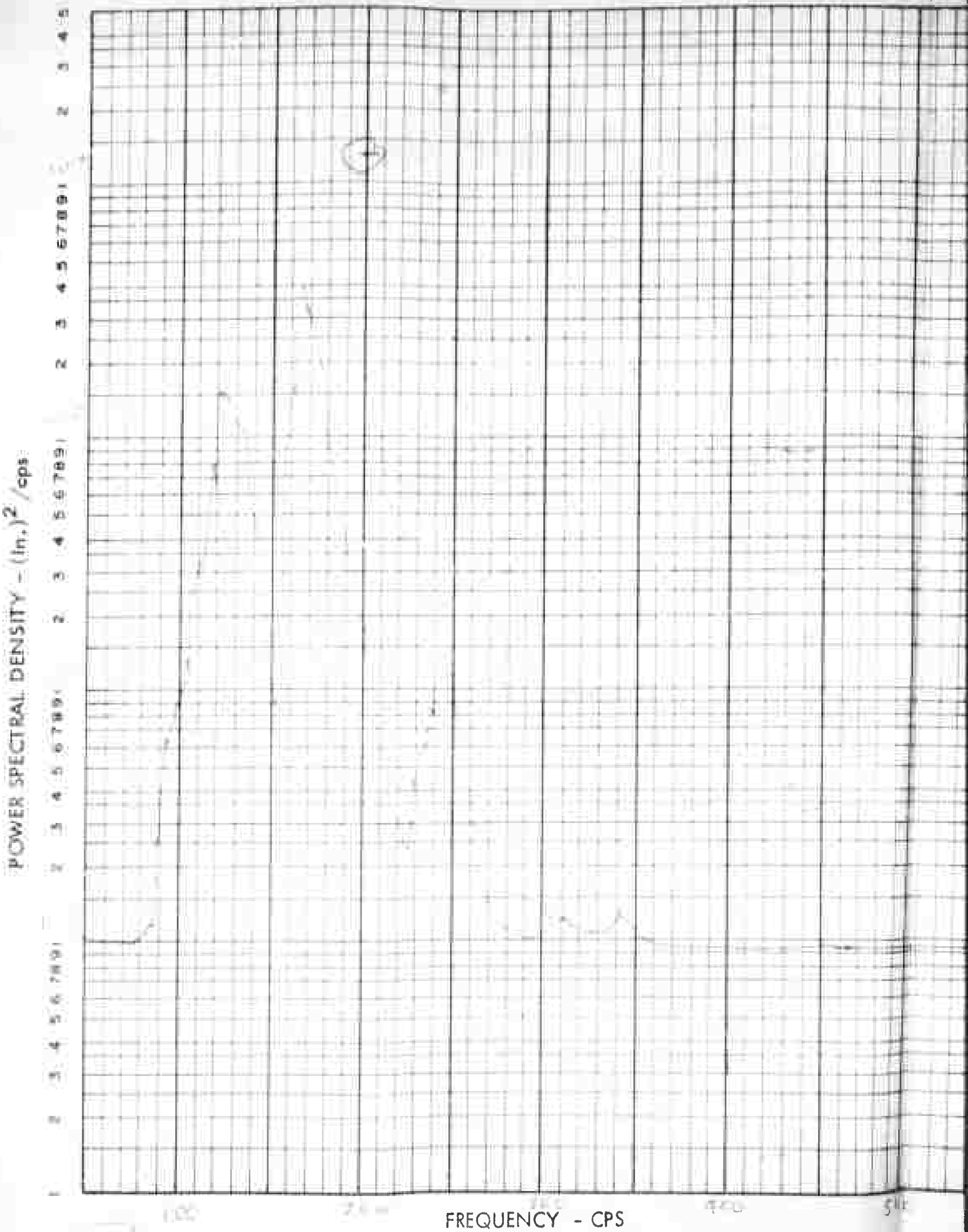
Tape No. 14	Tape Channel 1	Data Tape RMS Volt V_R =
Calibration Voltage V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 In./Volt		
Equivalent of Calibration - In. $D_c = V_a \cdot S$ = (.5) (.0708) = .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting db	Log Converter Setting db	
Calibration Plotted at in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ______ = psi		

2

500

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL. I
CHECK					1479 P/U 5	D2-80084
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG 114
APR.						

2-5353-4-38



1

ANALYSIS VARIABLES

Bandwidth

____ cycles from ____ to ____ cps

____ cycles from ____ to ____ cps

____ cycles from ____ to ____ cps

T_c ____ Sec.

Anal. Rate ____ cps/sec.

Loop Length ____ Sec.

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM	
EWA No. 5593-1	Panel or Specimen No. 1479

Tape No. 14	Tape Channel 6	Displacement Pickup # 6

Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 14	Tape Channel 1	Data Tape RMS Volt V_R = 0.260

Calibration Voltage
V_a = V_{rms} Into Line Amp.; V_c = 0.5 V_{rms} on Tape cps

Line Amplifier Settings
For Calibration G_c = 0.1 ; for Data G_d = 0.1

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1

Displacement Pickup Sensitivity
S = 0.0708 in./Volt

Equivalent of Calibration - In.
$D_c = V_a \cdot S$ = (0.5)(0.0708) = 0.0354

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\ [illegible]\ \right]$$ in.^{2}/cps

Analyzer Attenuator Setting −10 db	Log Converter Setting db

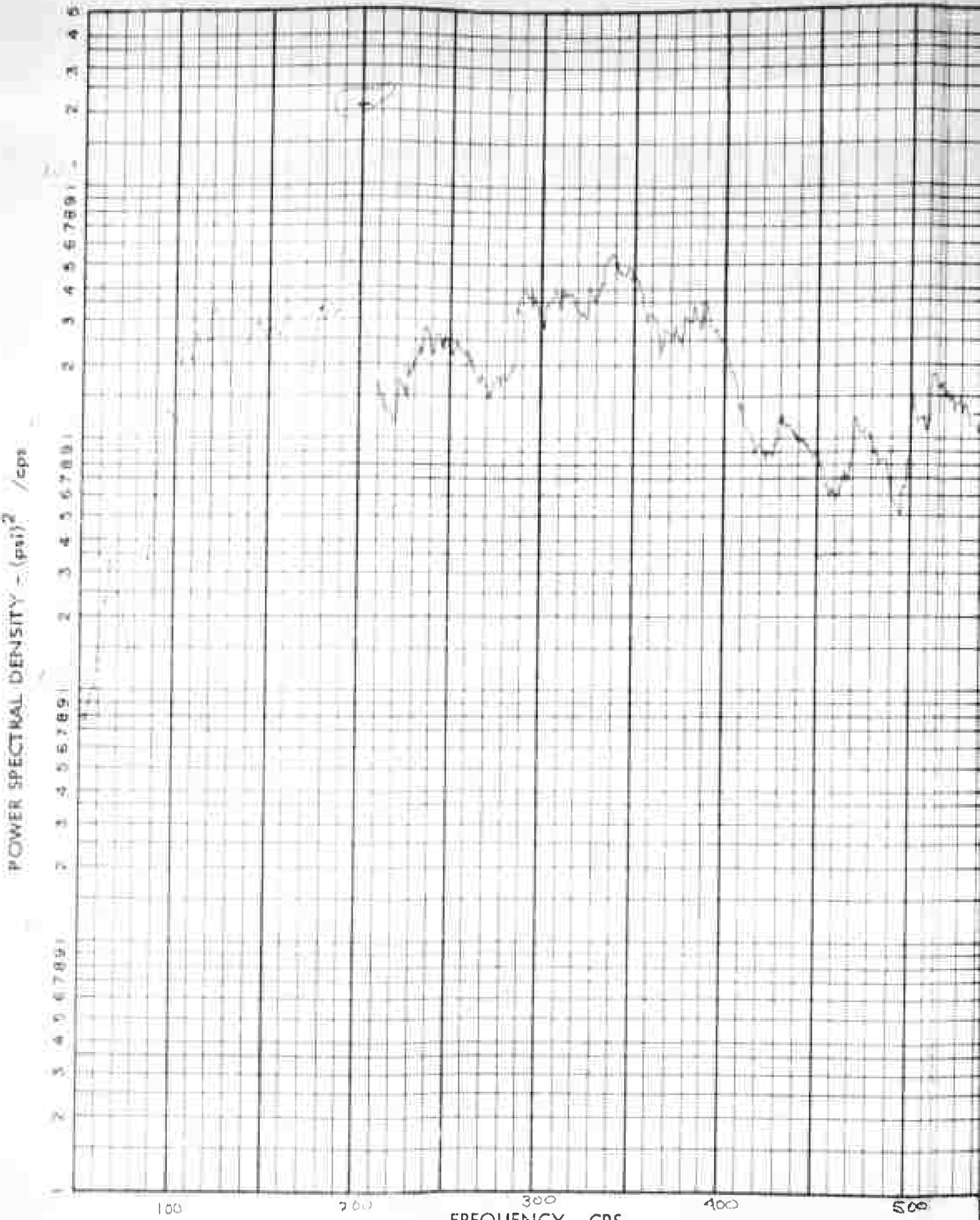
Calibration Plotted at [illegible] x 10^{-4} in.^{2}/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$$
$$= \_\_\_\_\_\_ =$$ psi

2

CALC	RES	9/30/60	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
CHECK	RDS	10-23			VOL I.
APR.					1479 P/U 6
APR					D2-80024
					THE BOEING COMPANY SEATTLE 24, WASHINGTON
					PAGE FIG 115

2-5353-4-38



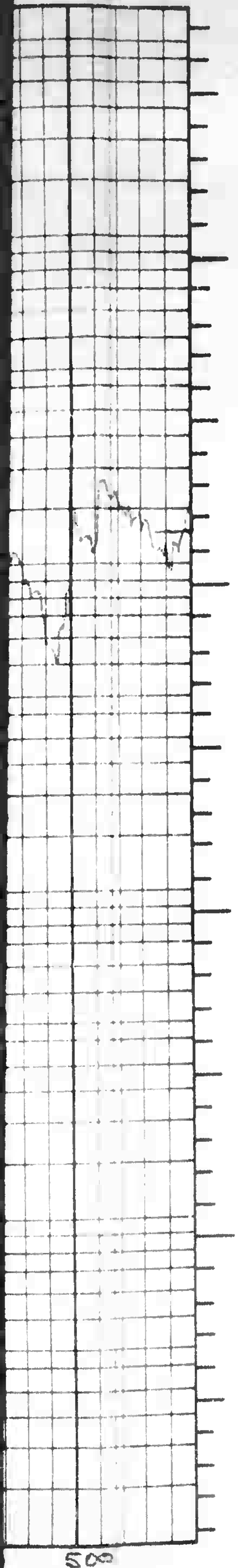
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/Sec.
Loop Length 4 Sec.



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

2

DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM	
EWA No.: 5593-1	Panel or Specimen No.: 1479

Tape No.: 15	Tape Channel: 2	Mic. No.: 1

Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No.: 15	Tape Channel: 1	Data Tape RMS Volt V_R =

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ .20 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = (.5) (.290) .145

Equivalent of Calibration for PSD Plots
$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{1 \times 1}\right]$ = 2.1 x 10⁻² psi²/cps

Analyzer Attenuator Setting db	Log Converter Setting db

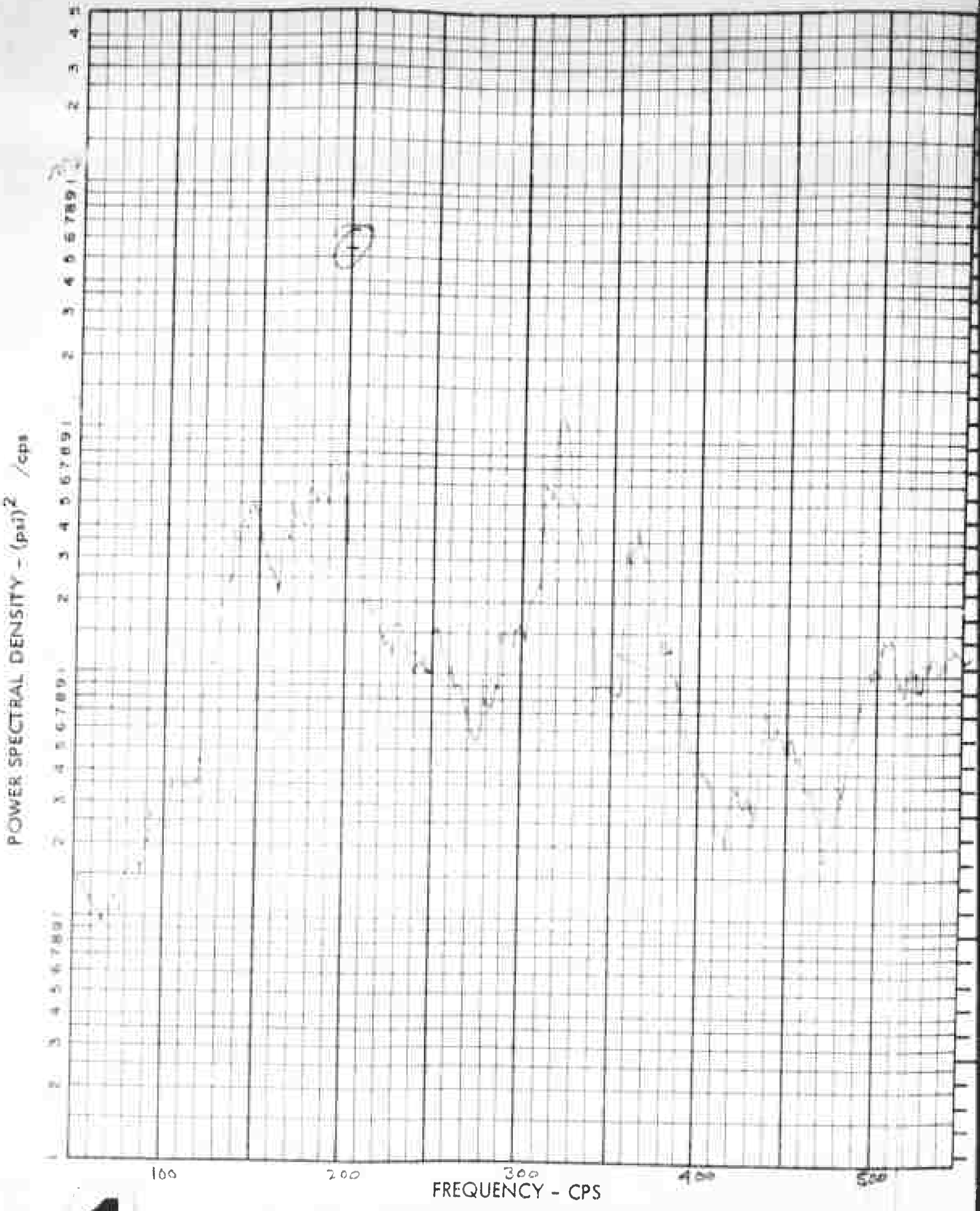
Calibration Plotted at psi²/cps

Overall Pressure Level Data	Equiv. to db SPL

RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ———— = psi

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT	VOL I
CHECK					1479 MIC 1	
APR.					THE BOEING COMPANY	PAGE FIG 116
APR.						

2-5353-4-35



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

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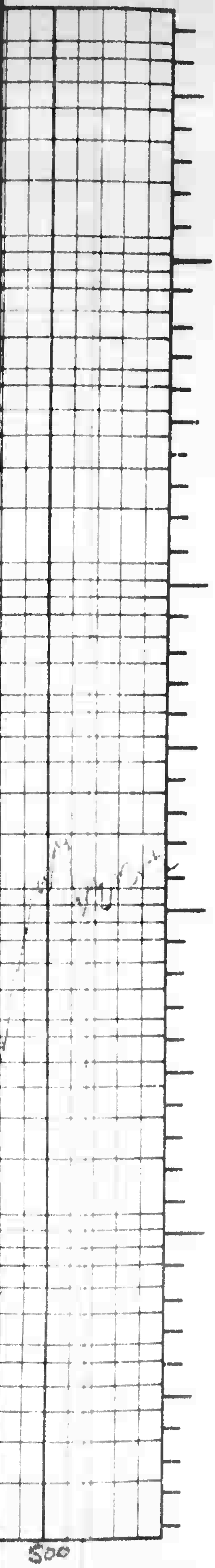

SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM	
EWA No.: 5593-1	Panel or Specimen No.: 1479
Tape No.: 15	Tape Channel: 3 — Mic. No.: 2
Elapsed Test Time	Mic. RMS Level at Sonic Lab. $V_L =$ Volts

CALIBRATION

Tape No.: 15	Tape Channel: 3	Data Tape RMS Volt $V_R = .155$

Calibration Voltage
$V_a = .5 V_{rms}$ into Line Amp.; $V_c = .5\ V_{rms}$ on Tape @ 200 cps

Line Amplifier Settings
For Calibration $G_c = .1$; for Data $G_d = .2$

Lab. Gain $LG = 1$	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 2$

Microphone Sensitivity
$S = .290$ psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S = (.5)(.290) = .145$

Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{2 \times 1}\right]^2 = 5.26 \times 10^{-3}\ \text{psi}^2/\text{cps}$$

Analyzer Attenuator Setting -? db	Log Converter Setting db

Calibration Plotted at 5.26 × 10⁻⁵ psi²/cps

Overall Pressure Level Data | Equiv. to db SPL

RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$

$= \underline{\qquad\qquad} =$ psi

2

CALC	[illegible]	[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1479 MIC 2
CHECK	RDS	[illegible]			VOL I
APR					D2 [illegible]
APR					THE BOEING COMPANY
					PAGE FIG 117

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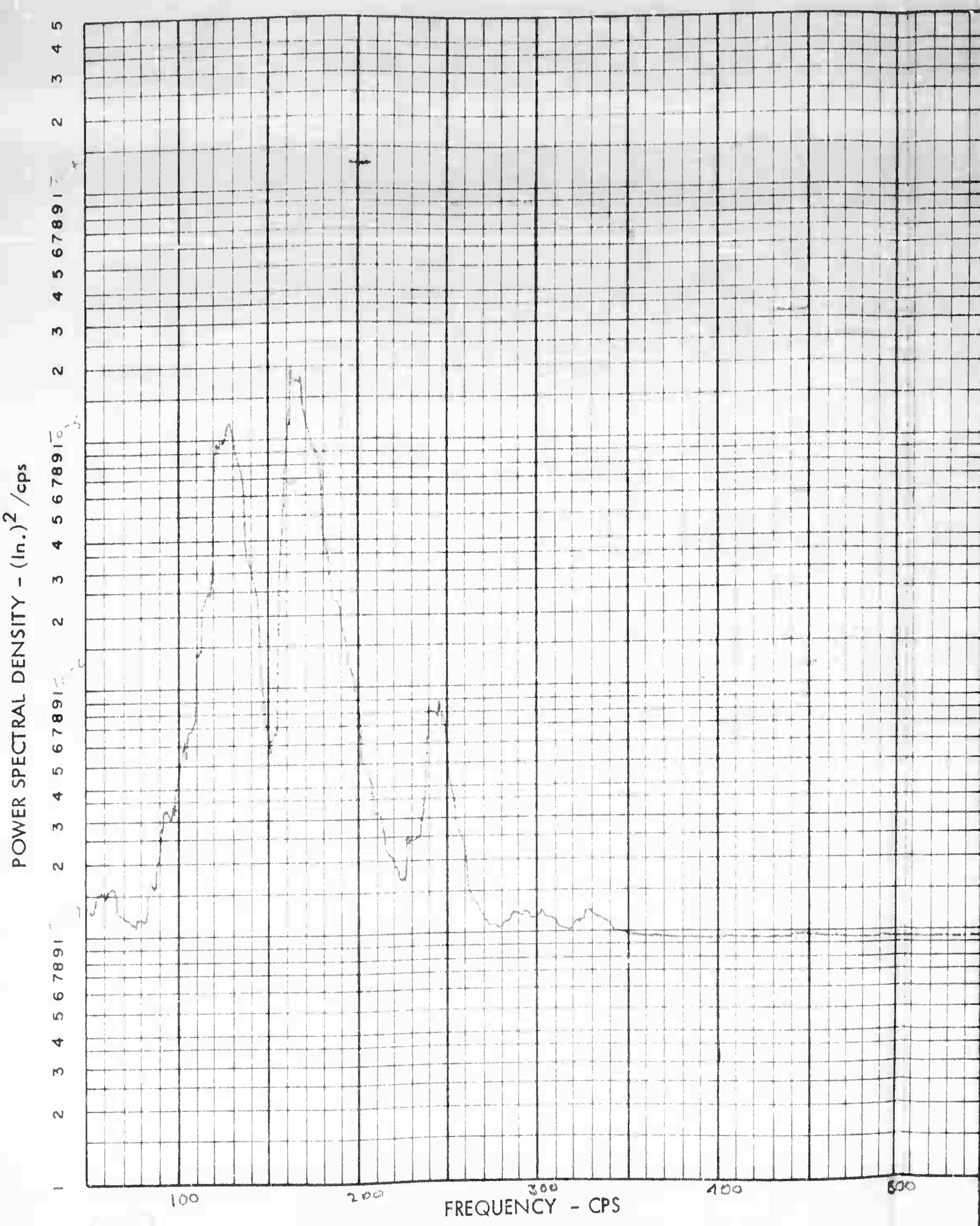

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 15	Tape Channel 4	Displacement Pickup # 1
Elapsed Test Time	P/U RMS Level at Sonic Lab. $V_L =$ Volts	

CALIBRATION

Tape No. 15	Tape Channel 1	Data Tape RMS Volt $V_R =$ 250

Calibration Voltage
$V_a =$ .5 V_{rms} Into Line Amp.; $V_c =$ .5 V_{rms} on Tape 200cps

Line Amplifier Settings
For Calibration $G_c =$ .1 ; for Data $G_d =$ .1

Lab. Gain
LG = 1

Tape Monitor Gain $TMG = \frac{G_d}{G_c} =$ 1

Displacement Pickup Sensitivity
S = .0708 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S = (.5)(.0708)$ .0354

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting -10 db	Log Converter Setting db

Calibration Plotted at
1.25×10^{-3} in.^{2}/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$$
$$= \_\_\_\_\_\_ = \text{ psi}$$

2

800

CALC	RCS	9/ /63	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CHECK	RIS	10-2-3			1479 P/U 1	D2 80084
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG 118
APR						

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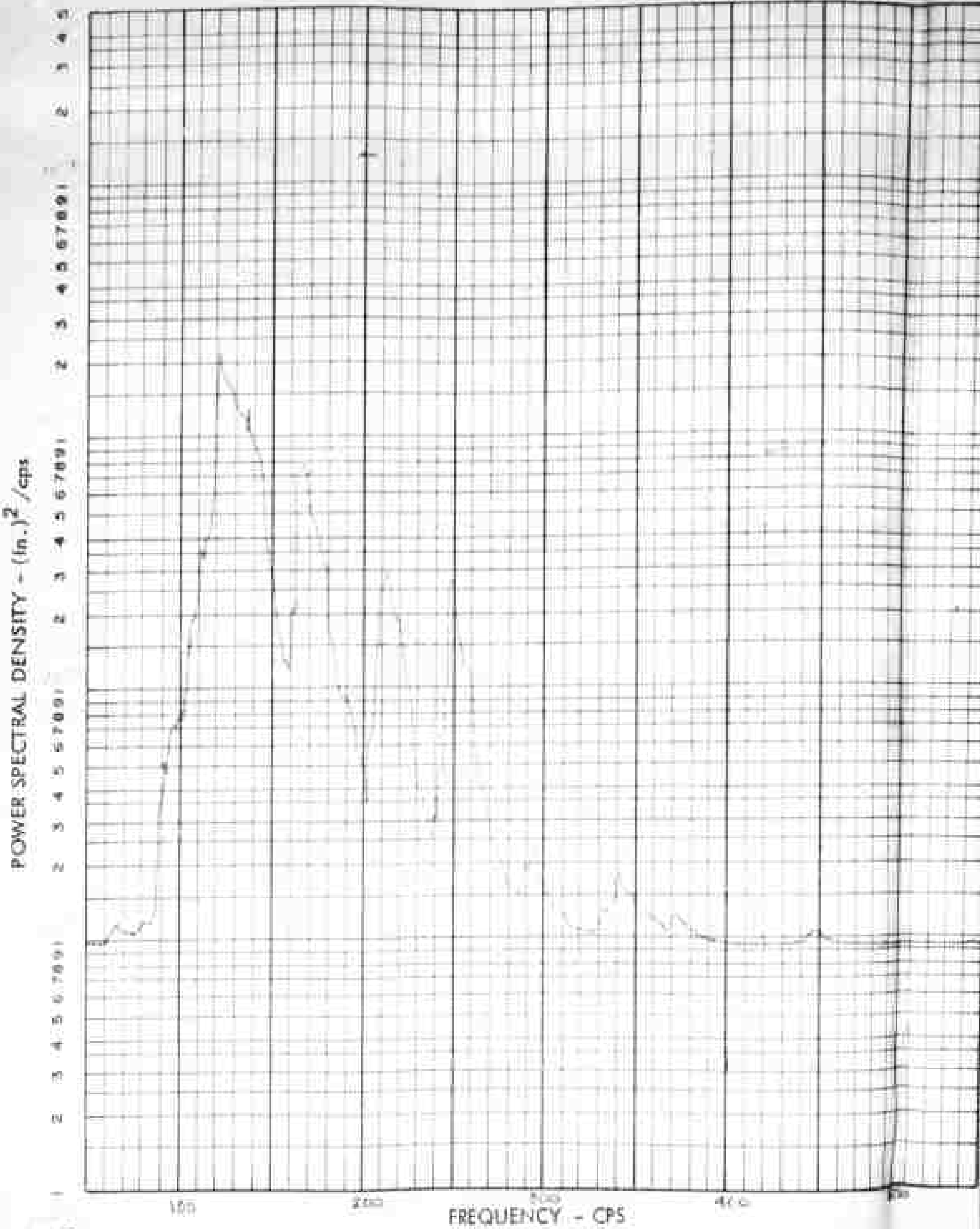

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps — T_e 4 Sec.

___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/sec.

___ cycles from ___ to ___ cps — Loop Length 9 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PREUM	
EWA No. 5593-1	Panel or Specimen No. 1479

Tape No. 15	Tape Channel 5	Displacement Pickup # 5

Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 15	Tape Channel 1	Data Tape RMS Volt V_R = [illegible]

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c} =$ 1

Displacement Pickup Sensitivity
S = .0708 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S = (.5)(.0708)$ .0354

Equivalent of Calibration for PSD Plots

$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting [illegible] db	Log Converter Setting db

Calibration Plotted at [illegible] in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$$

= __________ = psi

2

600

CALC	[illegible]	[illegible]	REVISED	DATE
CHECK	[illegible]	10-2-[illegible]		
APR.				
APR				

POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP

1479 P/U 5

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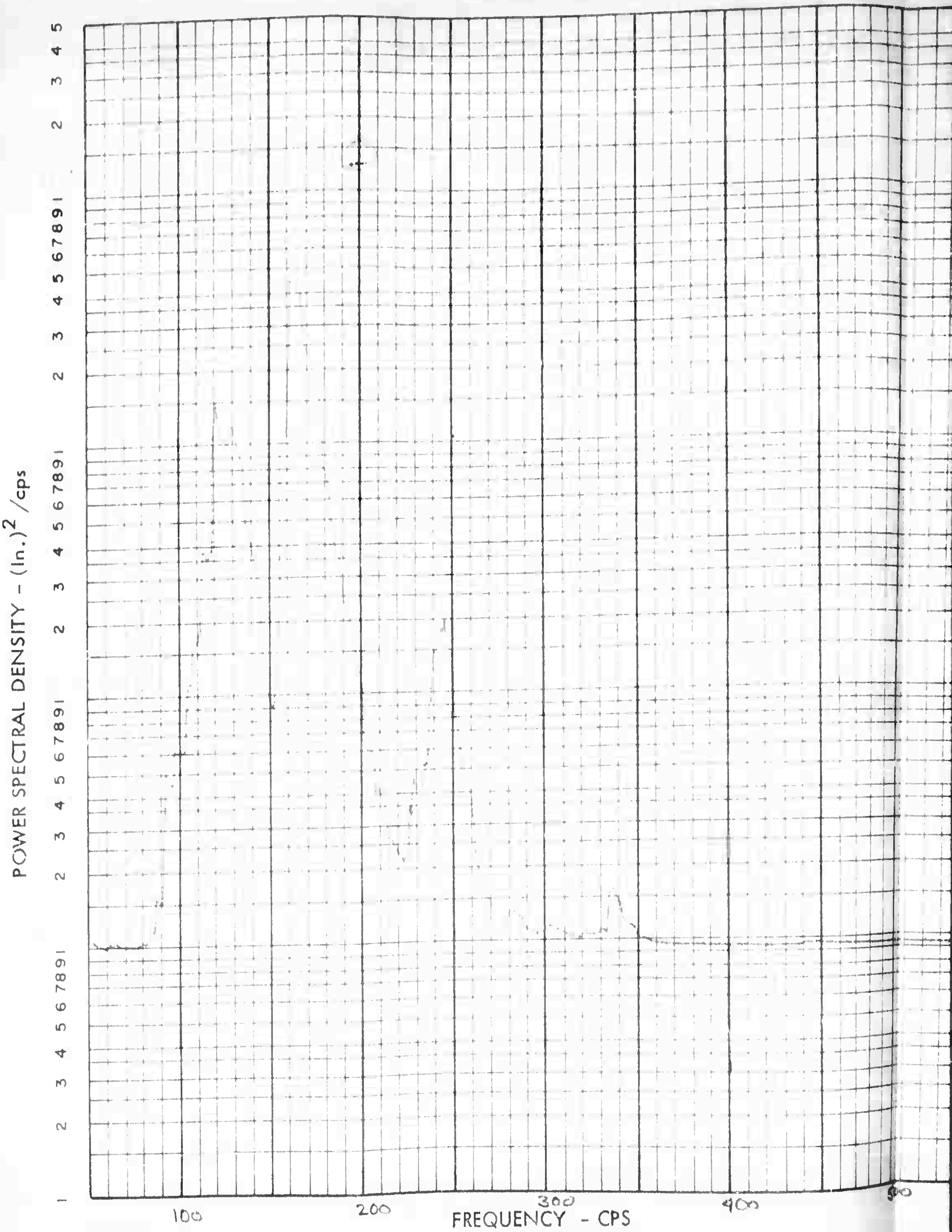

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1479	
Tape No. 15	Tape Channel 6	Displacement Pickup 6
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 15	Tape Channel 1	Data Tape RMS Volt V_R = [illegible]

Calibration Voltage
V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 2.00cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1 | Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 1$

Displacement Pickup Sensitivity
S = .0708 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S = (.5)(.0708) = .0354$

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting [illegible] db	Log Converter Setting db

Calibration Plotted at in.^{2}/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$$
$$= \_\_\_\_\_\_ = \quad \text{psi}$$

2

			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CALC						
CHECK	[illegible]	[illegible]				
APR.					1479 P/U 6	D2 [illegible]
APR					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE [illegible]

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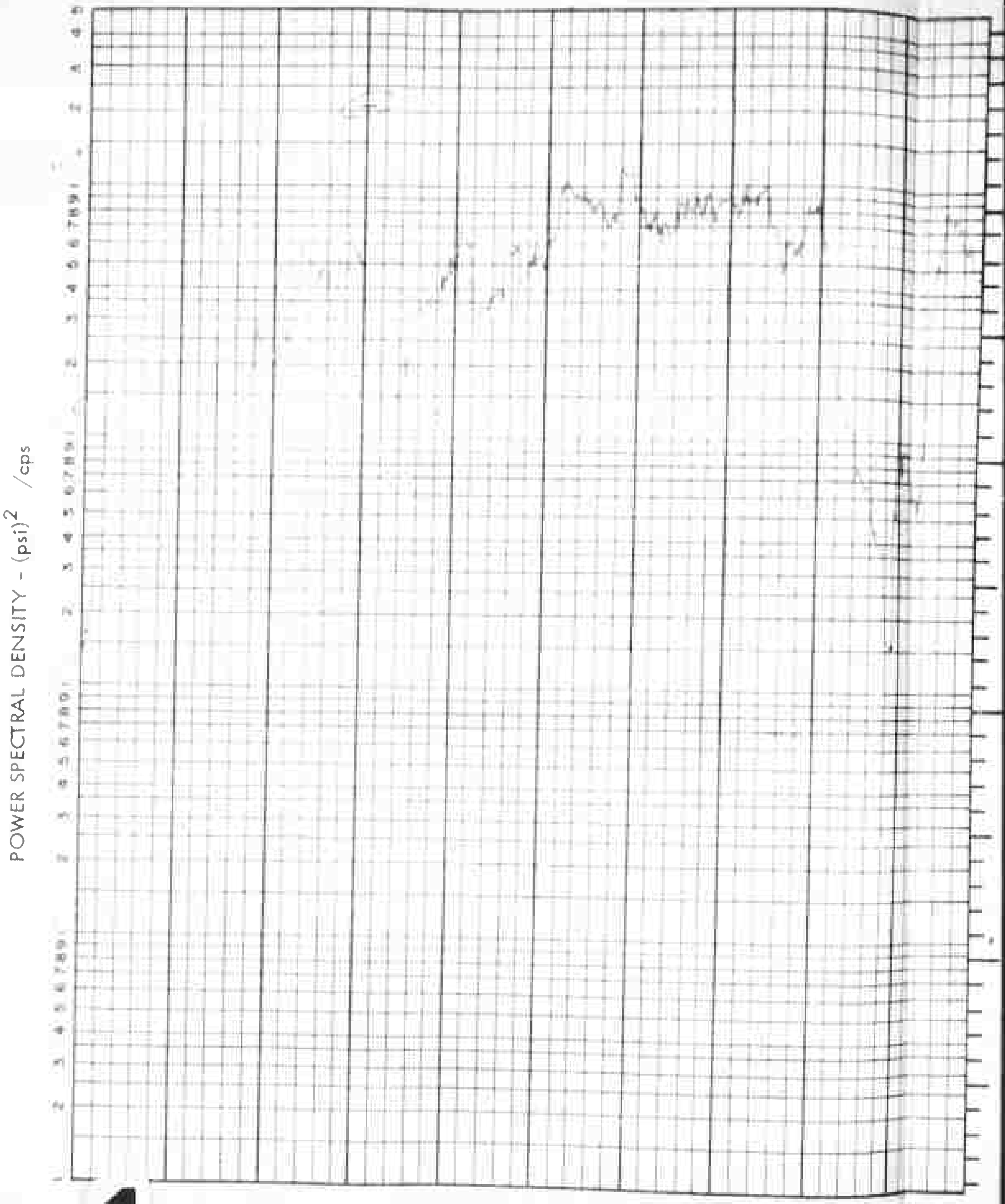


1

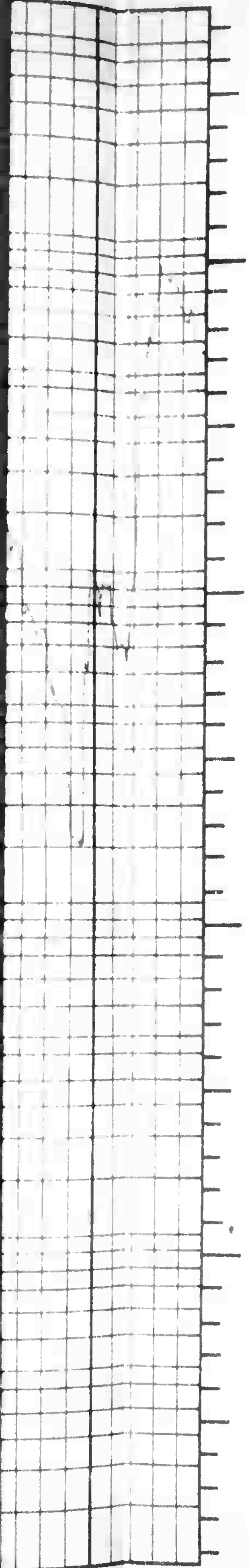
ANALYSIS VARIABLES

Bandwidth

___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T ___ Sec.
Anal. Rate ___ cps/Sec.
Loop Length ___ Sec.

CALC
CHECK
APR
APR



2

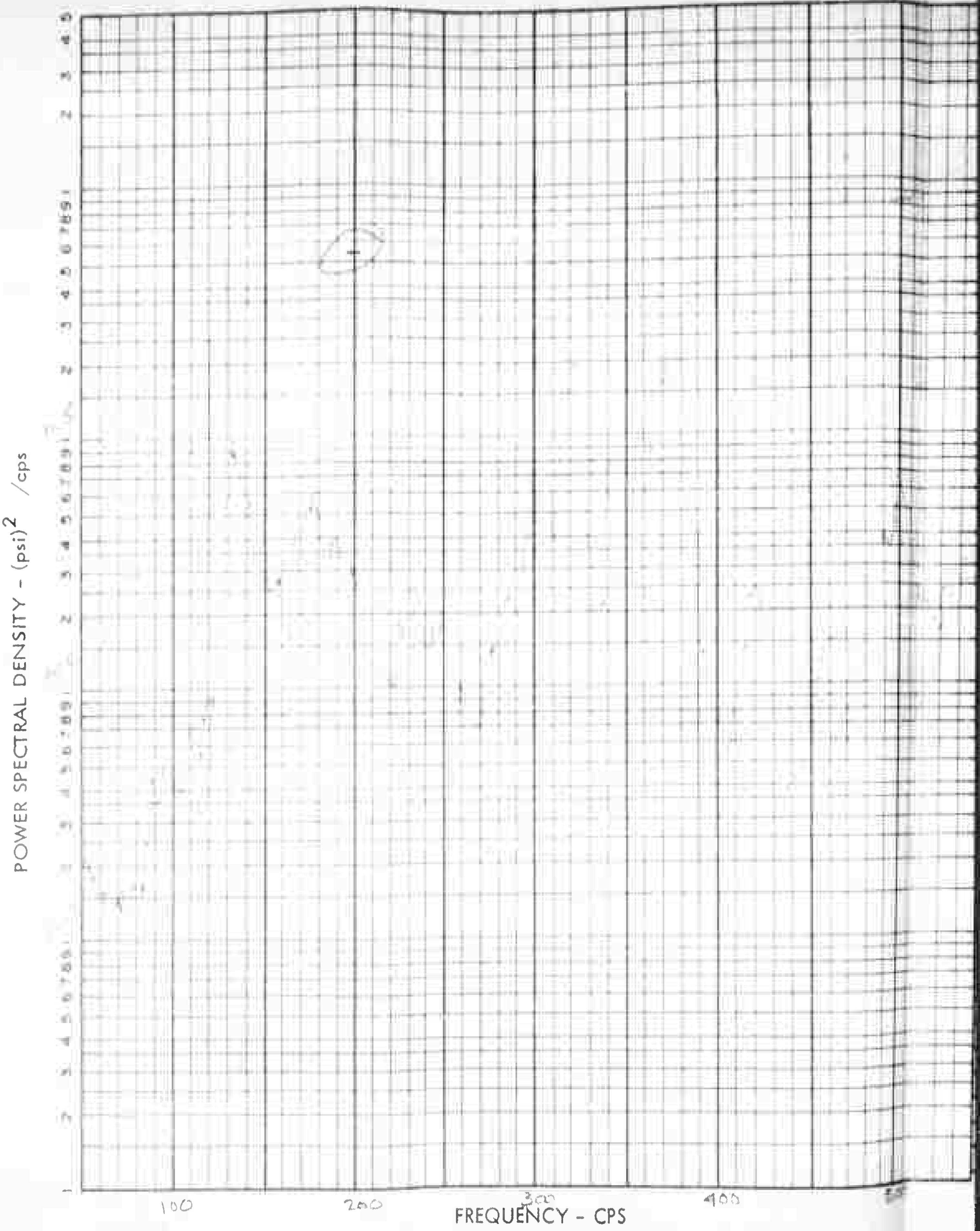
DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE 1 PRELIM		
EWA No.: 5573-1	Panel or Specimen No.: 1473	
Tape No.: 15	Tape Channel: 2	Mic. No.: 1
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No.: 16	Tape Channel: 1	Data Tape RMS Volt V_R = 0.9
Calibration Voltage V_a = 0.5 V_{rms} into Line Amp.; V_c = 2.5 V_{rms} on Tape @ 250 cps		
Line Amplifier Settings For Calibration G_c = 0.1 ; for Data G_d = 0.1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Microphone Sensitivity S = 0.29 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = (0.5)(0.290) = 0.145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{0.145}{1 \times 1}\right]^2 = 2.10 \times 10^{-2}$ psi²/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting db	
Calibration Plotted at 2.10 X 10⁻⁴ psi²/cps		
Overall Pressure Level Data RMS pressure Level $= \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} =$ psi	Equiv. to db SPL	

CALC	RFS		REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT	Vol I
CHECK	HPS				1473 MIC 1	D6 8094
APR.					THE BOEING COMPANY	PAGE FIG 121
APR.						



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/Sec.
Loop Length 4 Sec.

SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM	
EWA No. 5593-1	Panel or Specimen No. 1478

Tape No. 16	Tape Channel 3	Mic. No. 2

Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 16	Tape Channel 1	Data Tape RMS Volt $V_R = 0.355$

Calibration Voltage
$V_a = .5 V_{rms}$ into Line Amp.; $V_c = .5$ V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration $G_c = .1$; for Data $G_d = .2$

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 2$

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S = (.5)(.290) = .145$

Equivalent of Calibration for PSD Plots
$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(2)(1)}\right]^2 = 5.25 \times 10^{-3}$ psi^2/cps

Analyzer Attenuator Setting -20 db	Log Converter Setting db

Calibration Plotted at 5.25 x 10⁻³ psi^2/cps

Overall Pressure Level Data	Equiv. to db SPL

RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ______ = psi

2

CALC	F. F. S.	9-6-63	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT	Vol. I
CHECK					1478 Mic 2	D2 80021
APR					THE BOEING COMPANY	PAGE Fig. 122
APR						

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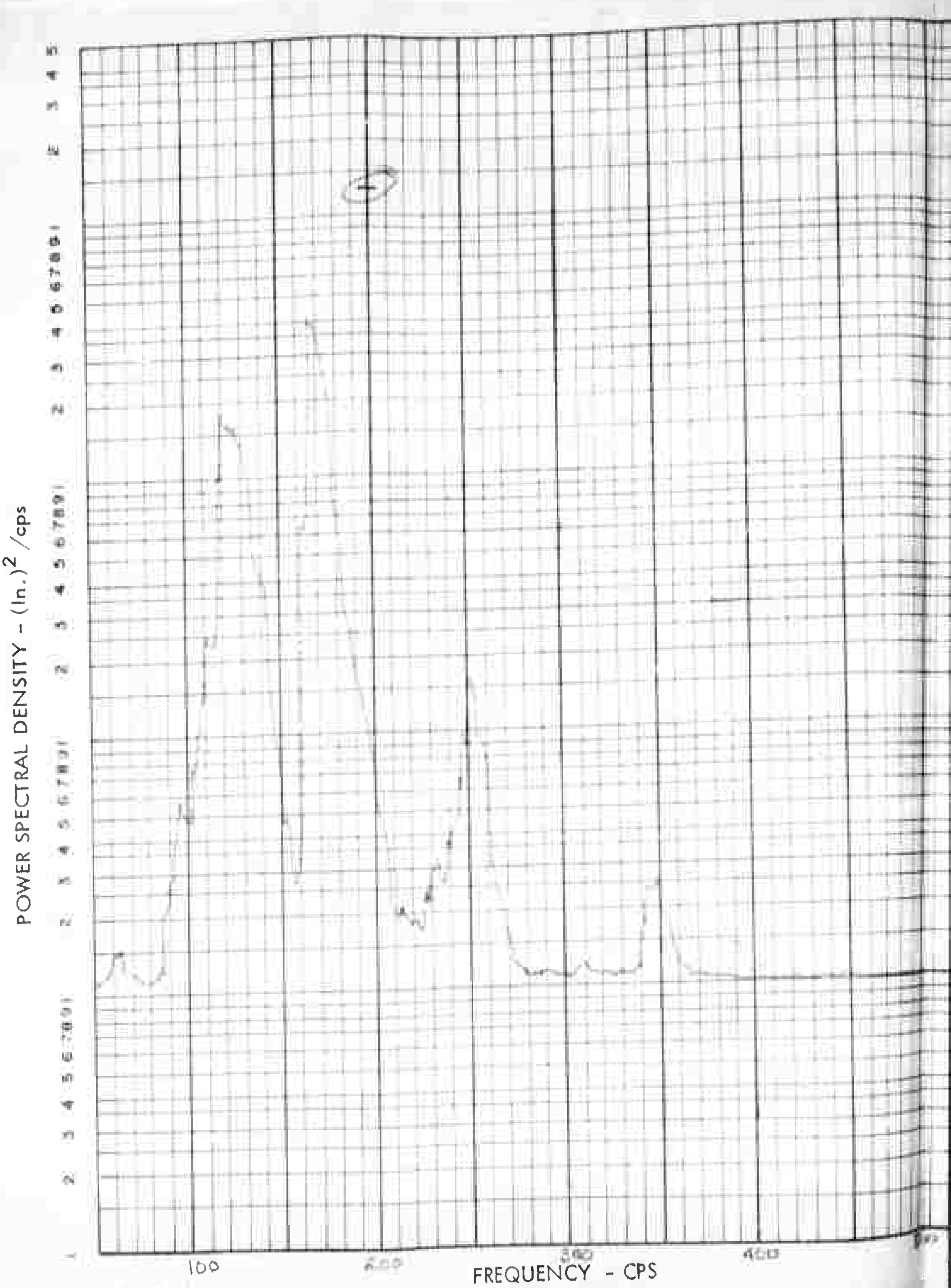

1

ANALYSIS VARIABLES

Bandwidth
5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/sec.
Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM.		
EWA No. 5593-1	Panel or Specimen No. 1478	
Tape No. 16	Tape Channel 4	Displacement Pickup # 1
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 16	Tape Channel 1	Data Tape RMS Volt V_R = .8
Calibration Voltage V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 260 cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0708) .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting -10 db	Log Converter Setting db	
Calibration Plotted at 1.25 x 10^{-4} in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ______ = psi		

2

CALC	RFS	7/1/63	REVISED	DATE
CHECK	RDS	10/63		
APR.				
APR				

POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP

1478 P/U 1

Vol. I

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THE BOEING COMPANY
SEATTLE 24, WASHINGTON

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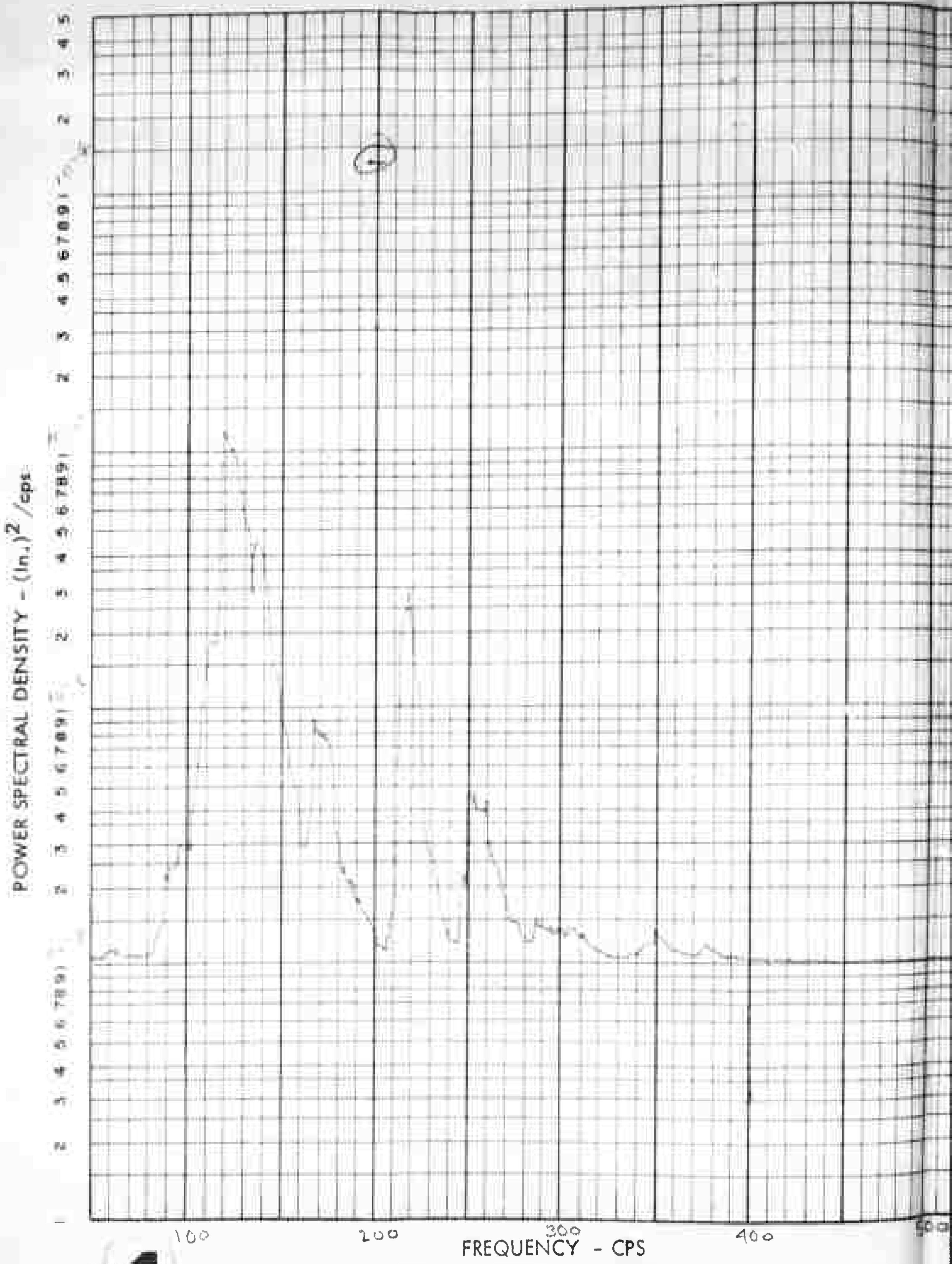

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM.		
EWA No. 5583-1	Panel or Specimen No. 1478	
Tape No. 16	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 16	Tape Channel 1	Data Tape RMS Volt V_R = 0.175

Calibration Voltage
V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1 | Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1

Displacement Pickup Sensitivity
S = .0708 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = (.5) (.0708) = .0354

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting -10 db | Log Converter Setting db

Calibration Plotted at 1.25 × 10⁻¹ in.²/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$$
= ______________ = psi

2

500

CALC	RJS	9/10/63	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CHECK	RDS	10-63			1478 P/U 5	D2-80084
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG 124
APR.						

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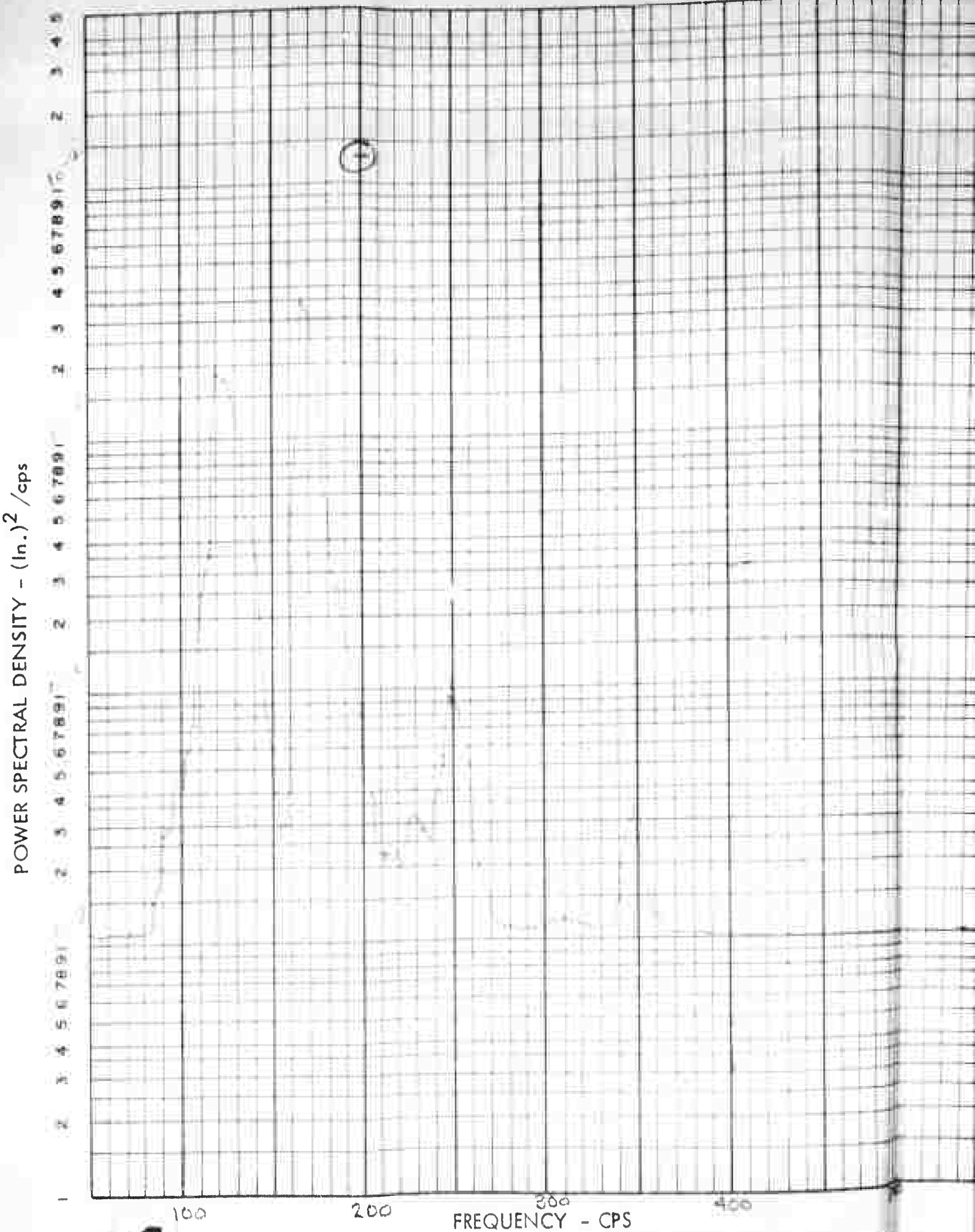


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps — T_c 4 Sec.

___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/sec.

___ cycles from ___ to ___ cps — Loop Length 4 Sec.

DATA IDENTIFICATION

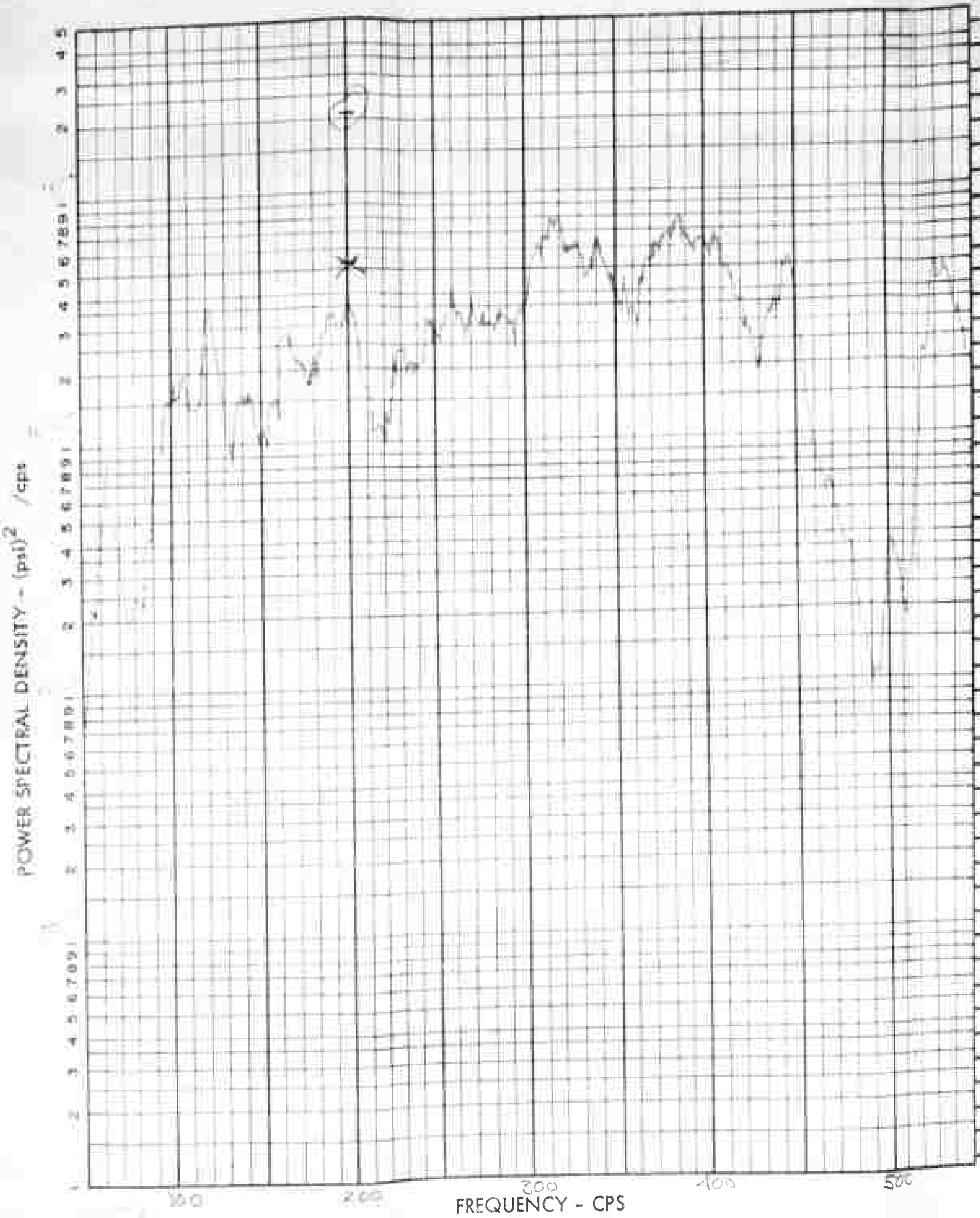
Test Title PANEL ATTACH. TYPE I PRELIM.		
EWA No. 5533-1	Panel or Specimen No. 1478	
Tape No. 16	Tape Channel 6	Displacement Pickup # 6
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 16	Tape Channel 1	Data Tape RMS Volt $V_R = 0.260$
Calibration Voltage $V_a = .5$ V_{rms} Into Line Amp.; $V_c = .5$ V_{rms} on Tape 200 cps		
Line Amplifier Settings For Calibration $G_c = .1$; for Data $G_d = .1$		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 1$	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S = (.5)(.0708) = .0354$		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right] = 1.25 \times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting -10 db	Log Converter Setting db	
Calibration Plotted at 1.0×10^{-4} in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$ = ______ = psi		

2

				POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CALC	RES	9/26/63	REVISED	DATE	1478 P/U 6	D2-80084
CHECK	RES	10/23			THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG 125
APR.						
APR.						

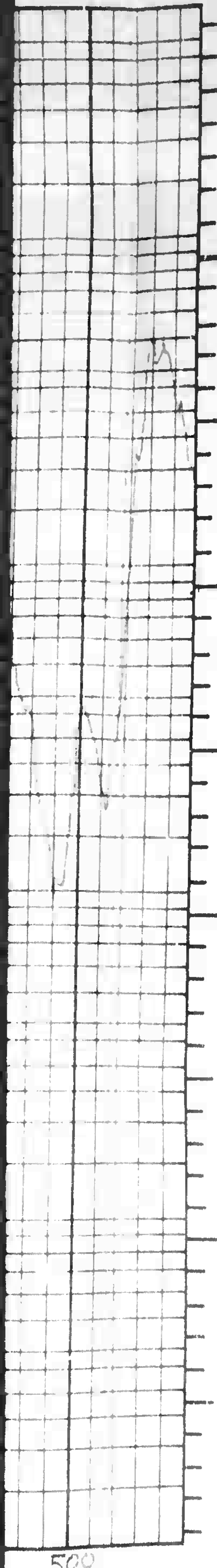


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	



DATA IDENTIFICATION

Test Title PANEL ATTACH. TYPE I PRELIM		
EWA No. 5598-1	Panel or Specimen No. 1478	
Tape No. 17	Tape Channel 2	Mic. No. 1
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 17	Tape Channel 1	Data Tape RMS Volt V_R = 0.410
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ [illegible] cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain TMG = $\frac{G_d}{G_c}$ = 1	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = .5(.290) = .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{1 \times 1}\right]^2 = 2.10 \times 10^{-2}$ psi²/cps		
Analyzer Attenuator Setting [illegible] db	Log Converter Setting db	
Calibration Plotted at 2.1 × 10⁻⁴ psi²/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ______ = psi	Equiv. to db SPL	

2

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1478 Mic 1
CHECK					
APR.					
APR					THE BOEING COMPANY

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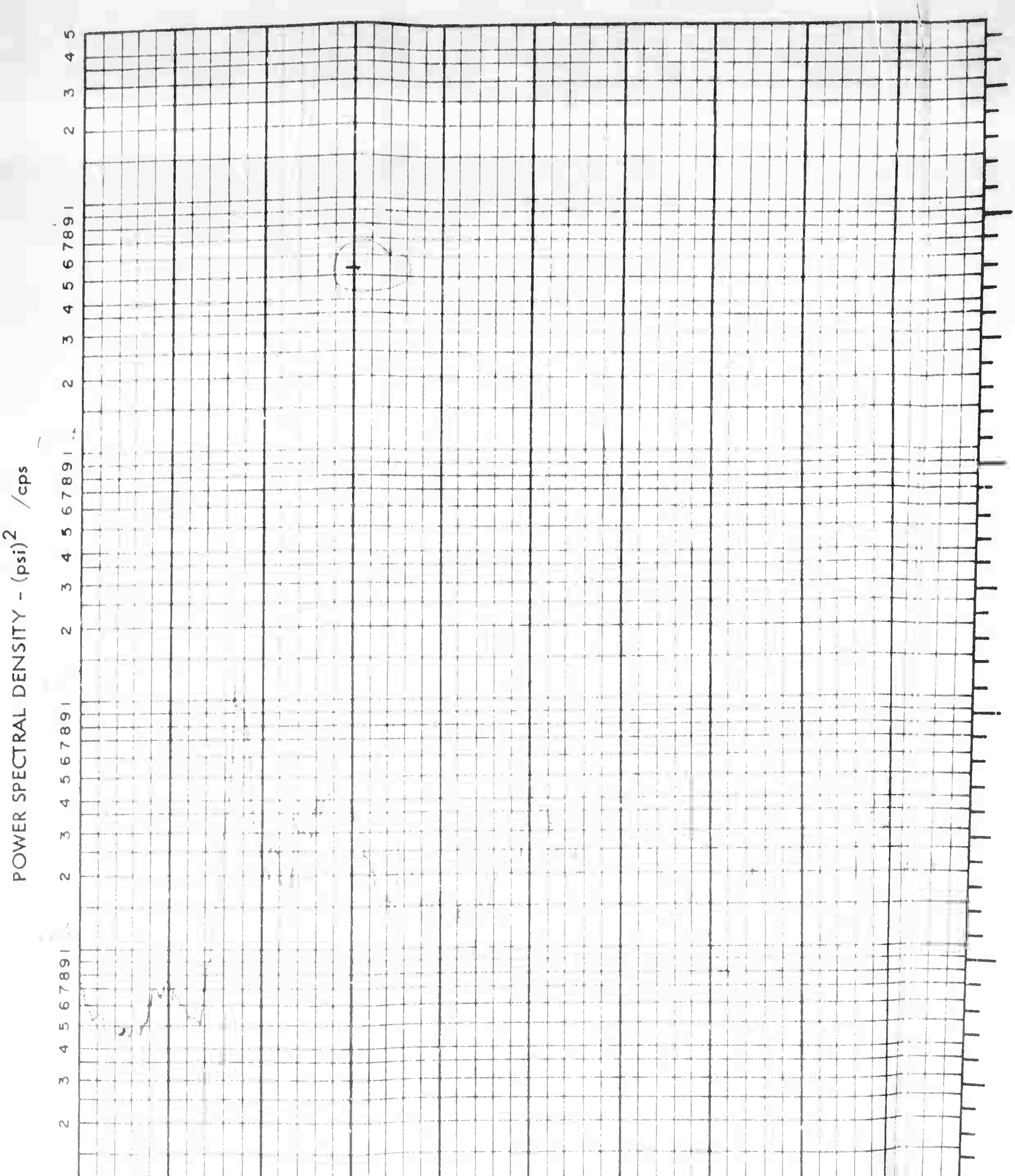


1

ANALYSIS VARIABLES

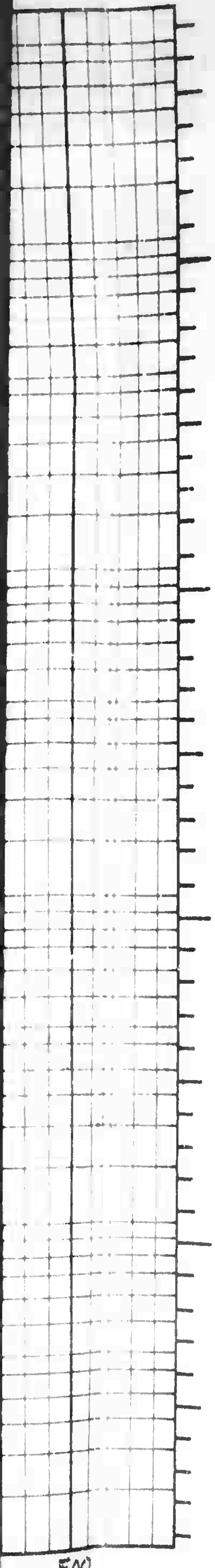
Bandwidth

5 cycles from 50 to 550 cps — T_c 4 Sec.

___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/Sec.

___ cycles from ___ to ___ cps — Loop Length 4 Sec.

CALC
CHECK
APR
APR



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

DATA IDENTIFICATION

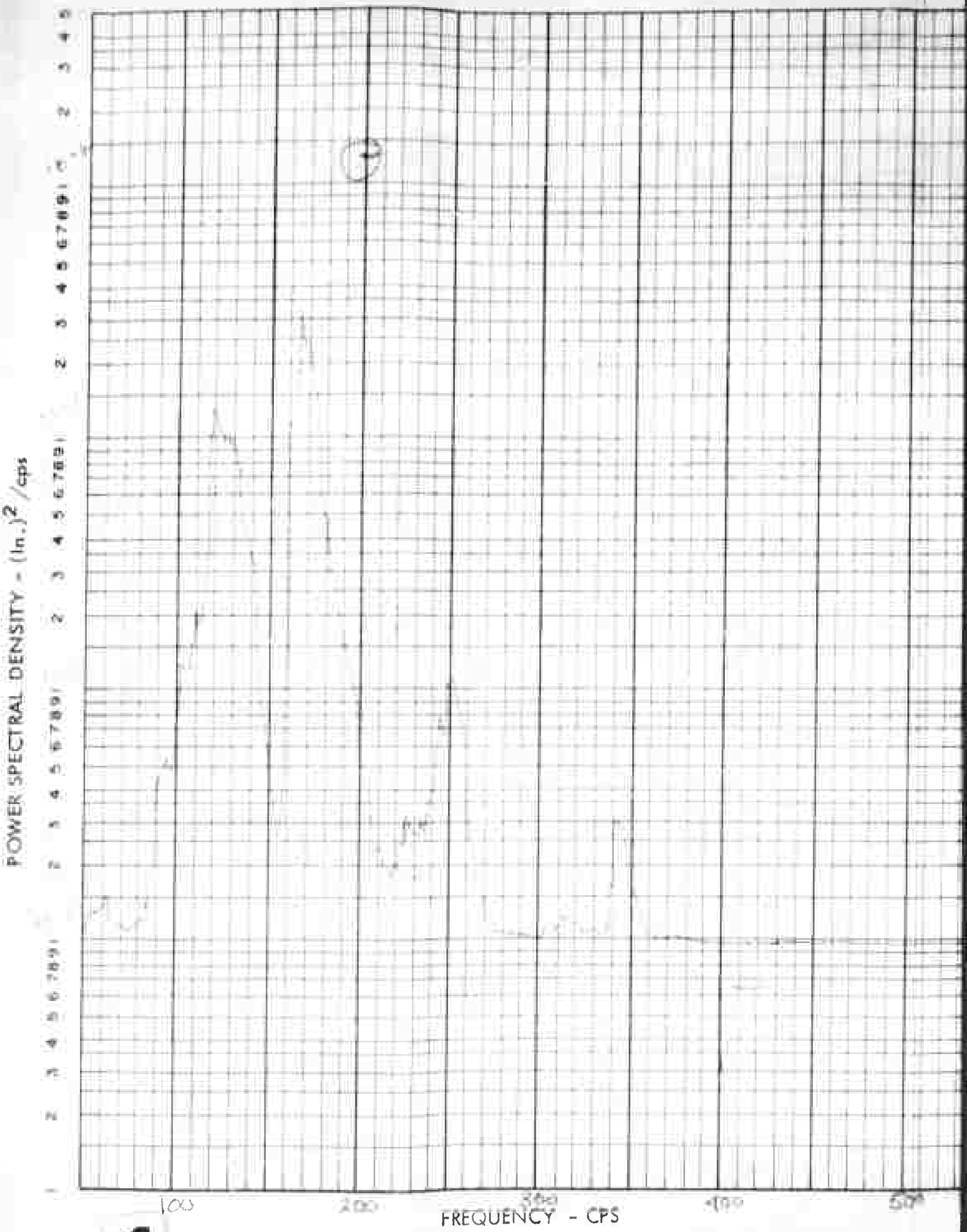
Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5508-1	Panel or Specimen No. 1478	
Tape No. 17	Tape Channel 3	Mic. No. 2
Elapsed Test Time	Mic. RMS Level at Sonic Lab. $V_L =$ Volts	

CALIBRATION

Tape No. 17	Tape Channel 1	Data Tape RMS Volt $V_R =$ 0.290
Calibration Voltage $V_a = .5 V_{rms}$ into Line Amp.; $V_c =$ .5 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration $G_c =$; for Data $G_d =$		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 2$	
Microphone Sensitivity S = 290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S =$ 1.5(1.290) .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{2\times1}\right]^2 = 5.26\times10^{-3}$ psi²/cps		
Analyzer Attenuaror Setting -10 db	Log Converter Setting db	
Calibration Plotted at 5.26 ×10⁻³ psi²/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ______ = psi	Equiv. to db SPL	

2

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1478 MIC 2
CHECK					D2-[illegible]
APR					THE BOEING COMPANY
APR					PAGE Fg 121



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps		T_c 4 Sec.	
___ cycles from ___ to ___ cps		Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps		Loop Length 4 Sec.	

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5503	Panel or Specimen No. 1478	
Tape No. 17	Tape Channel 4	Displacement Pickup # 1
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

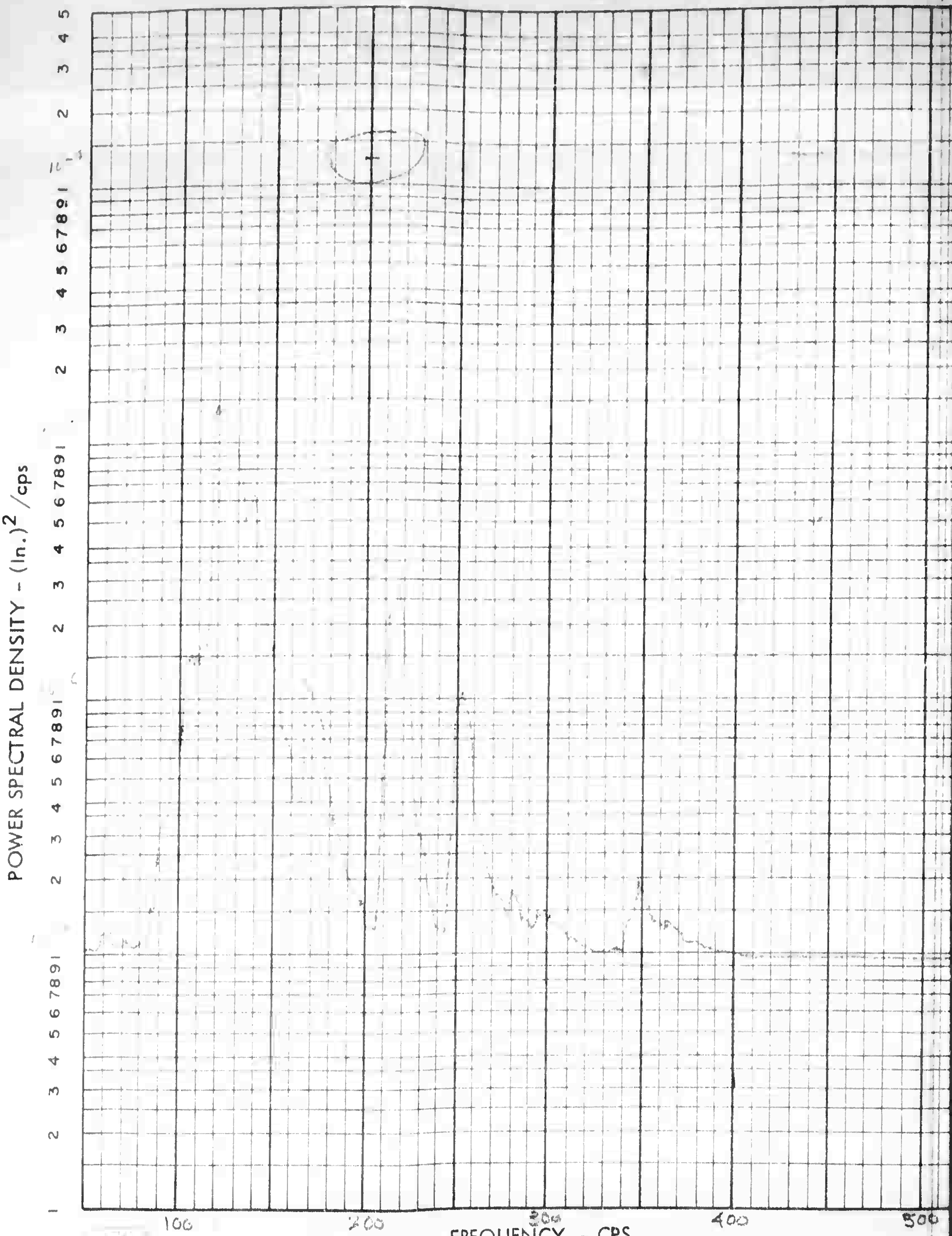
CALIBRATION

Tape No.	Tape Channel	Data Tape RMS Volt V_R = .26
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape 200cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0708) = .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{(1)(1)}\right]^2 = 1.25 \times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting -10 db	Log Converter Setting db	
Calibration Plotted at 1.25 x 10^{-4} in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ____________ = psi		

2

CALC	RFS	7/26/63	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CHECK	RBS	10-23			1478 P/U 1	D2-80084
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG 128
APR.						

2-5353-4-38



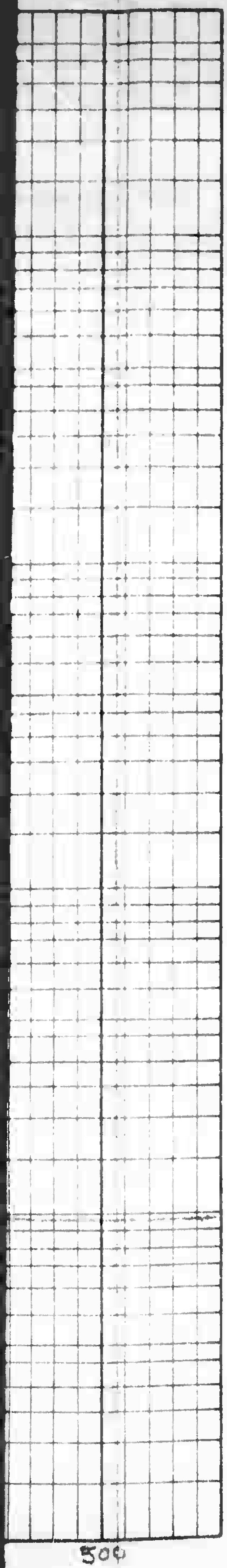
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/sec.
Loop Length 4 Sec.



DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM	
EWA No. 5593-1	Panel or Specimen No. 1478

Tape No. 17	Tape Channel 5	Displacement Pickup # 5

Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 17	Tape Channel 1	Data Tape RMS Volt V_R = 0.197

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c} =$ 1

Displacement Pickup Sensitivity
S = .0708 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = (.5) (.0708) = .0354

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2 = 1.25 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting -10 db	Log Converter Setting db

Calibration Plotted at
1.25 X 10^-4 in.^{2}/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$$
= ______________ = psi

2

CALC	RFS	9/26/63	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CHECK	RFS	10-2-3				
APR.					1478 P/U 5	D2-80084
APR					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE FIG. 129

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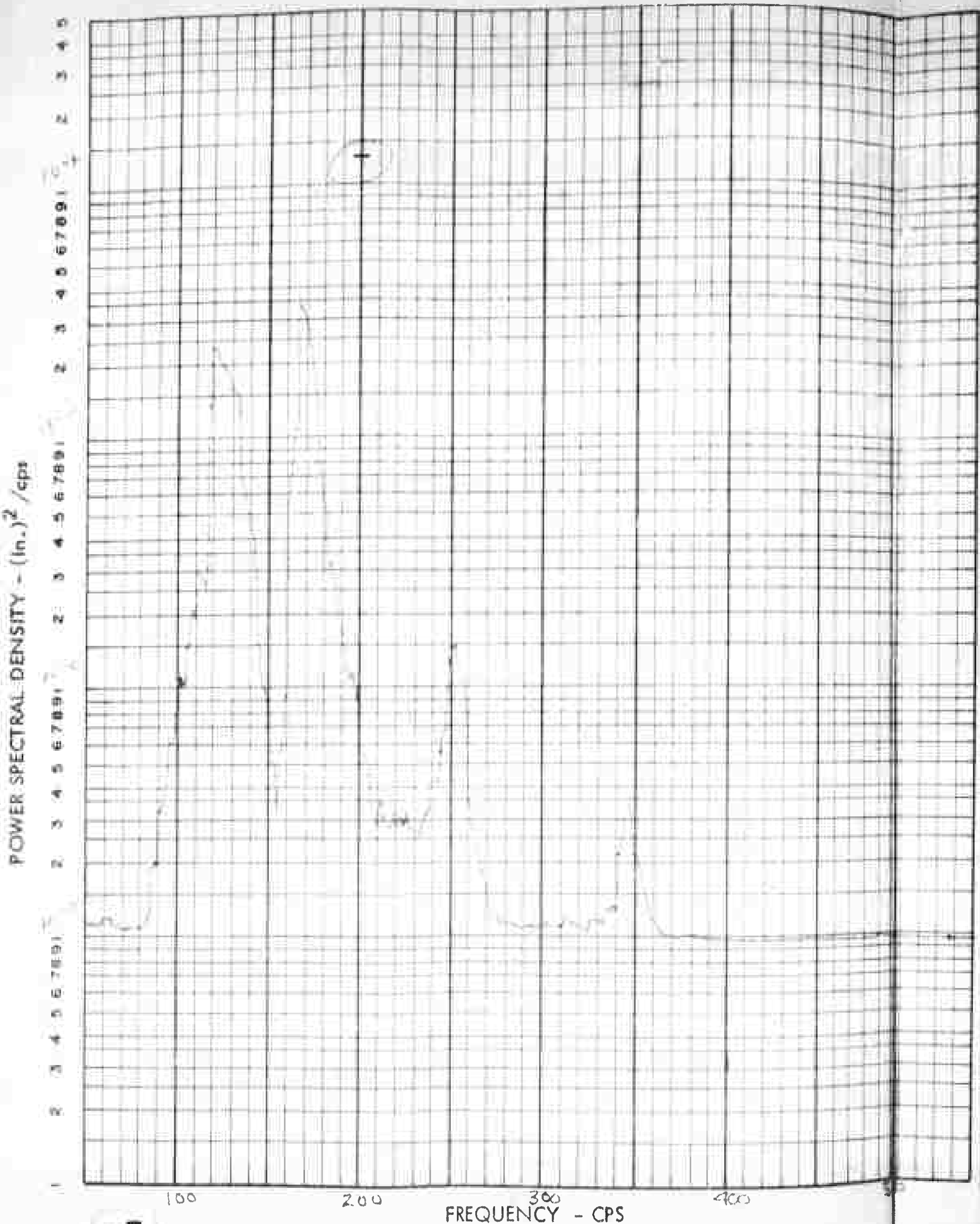

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps		T_c 4 Sec.
___ cycles from ___ to ___ cps		Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps		Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1478	
Tape No. 17	Tape Channel 6	Displacement Pickup # 6
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 17	Tape Channel 1	Data Tape RMS Volt V_R = .285
Calibration Voltage V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S = (.5)(.0708) = .0354$		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1\times 1}\right]^2 = 1.25\times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting -10 db	Log Converter Setting db	
Calibration Plotted at in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ———— = psi		

2

sec.

CALC	RES	9/10/63	REVISED	DATE
CHECK	LDS	10/63		
APR.				
APR				

POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP

1478 P/U 6

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Vol I

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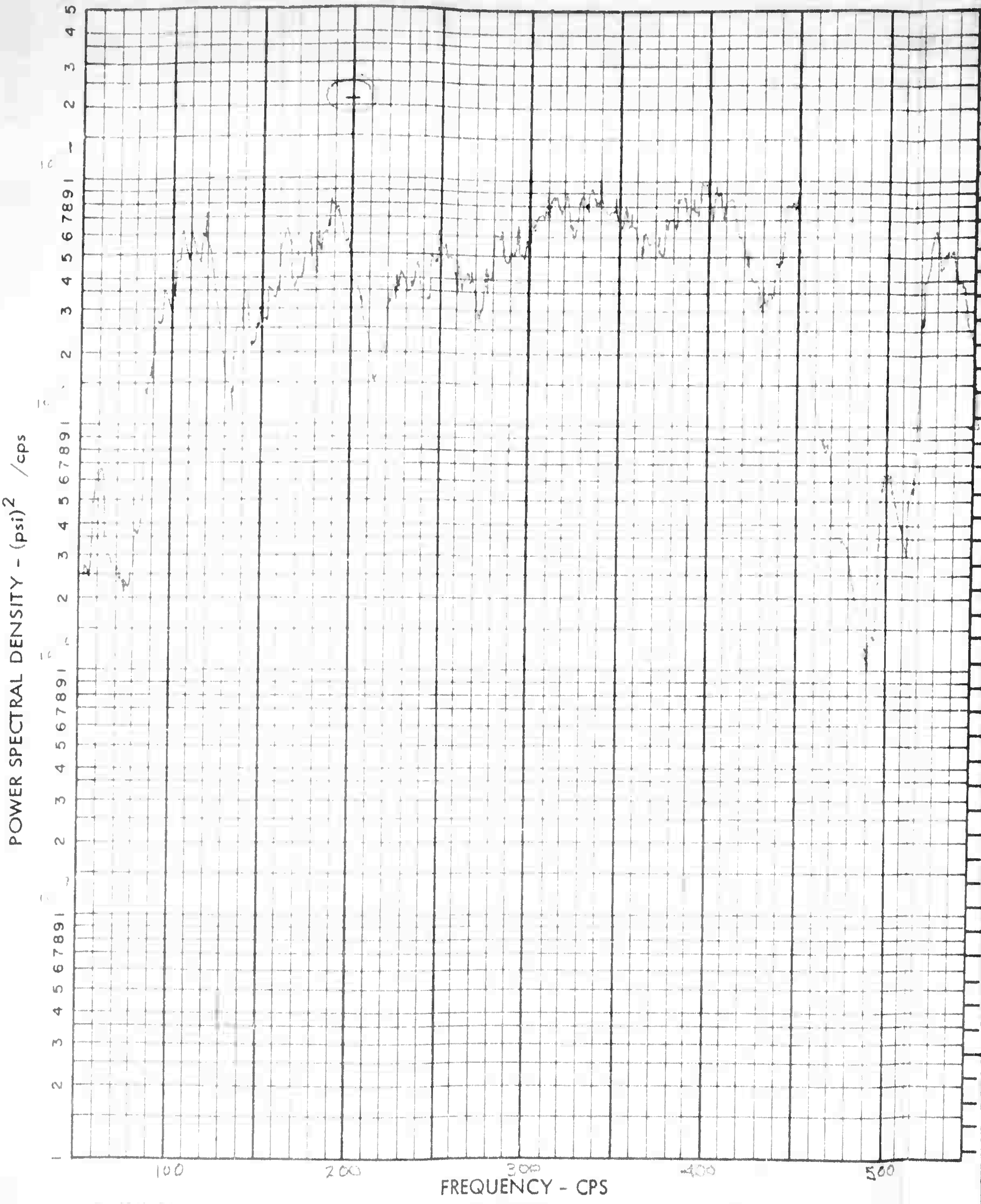

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

500

2

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1477	
Tape No. 18	Tape Channel 2	Mic. No. 1
Elapsed Test Time	Mic. RMS Level at Sonic Lab. $V_L =$ Volts	

CALIBRATION

Tape No. 18	Tape Channel 1	Data Tape RMS Volt $V_R =$
Calibration Voltage $V_a = .5 V_{rms}$ into Line Amp.; $V_c = .5\ V_{rms}$ on Tape @ 200 cps		
Line Amplifier Settings For Calibration $G_c = .1$; for Data $G_d = .1$		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 1$	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S = (.5)(.290) = .145$		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{1 \times 1}\right]^2 = 2.10 \times 10^{-2}$ psi²/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting db	
Calibration Plotted at 2.10×10^{-4} psi²/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{\quad}{\quad} =$ psi	Equiv. to db SPL	

CALC	RPJ	9/--/63	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1477 MIC 1	VOL I
CHECK		10-63				D2-80084
APR.					THE BOEING COMPANY	PAGE FIG 131
APR						

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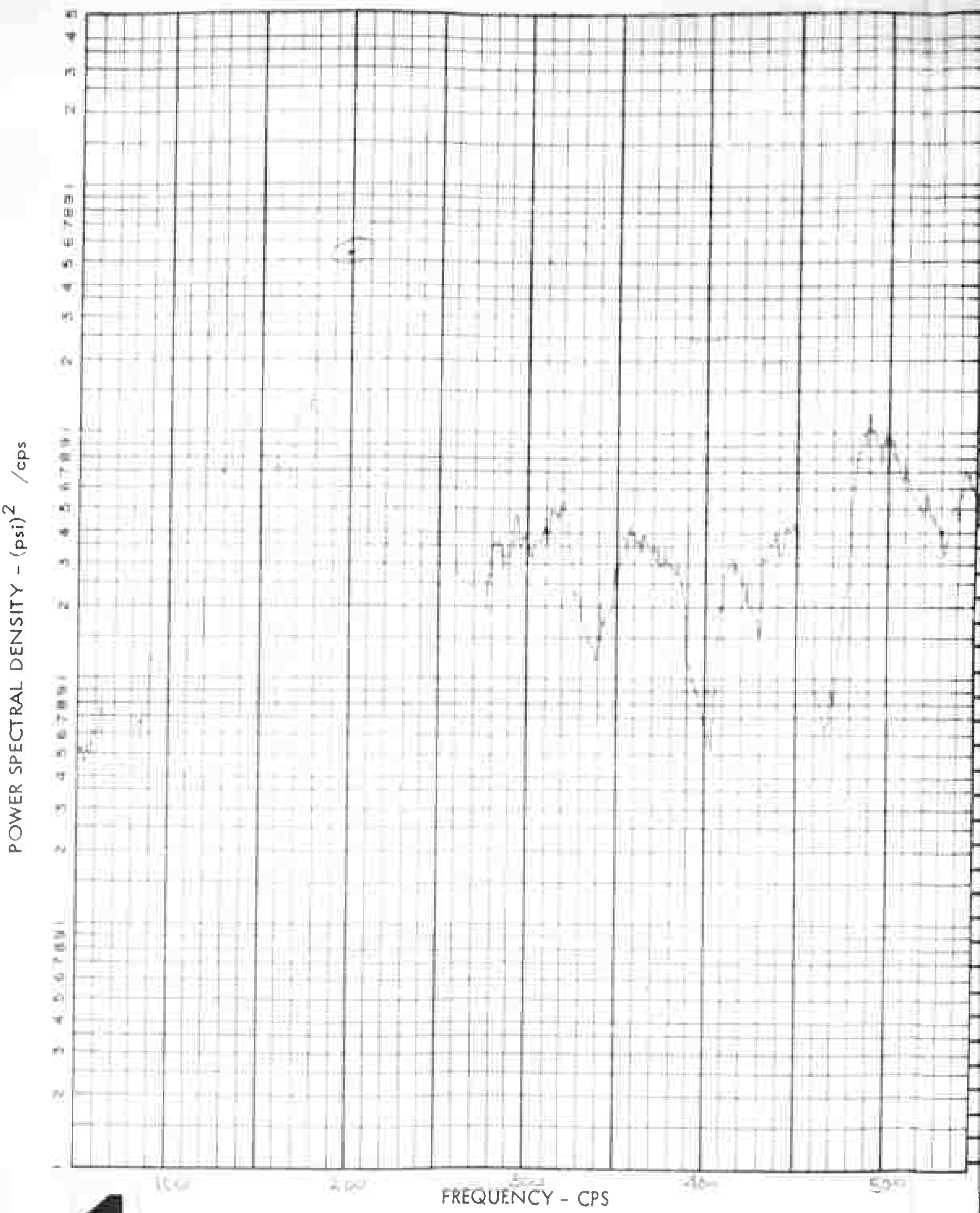
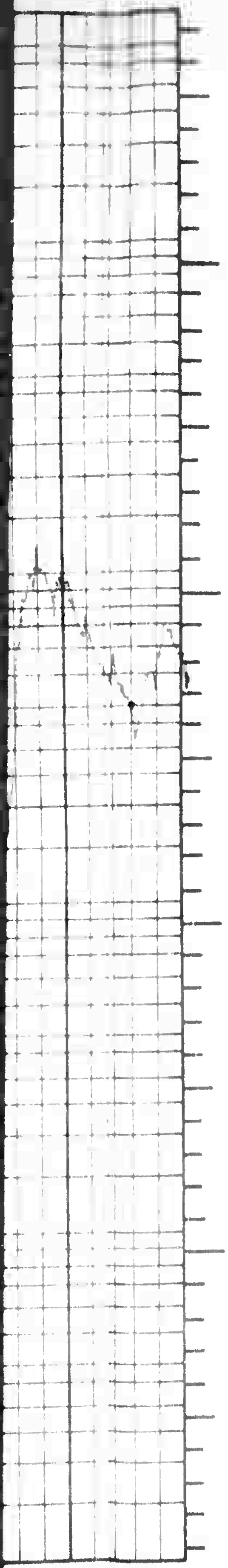


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	



500

SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

2

DATA IDENTIFICATION

Test Title
PANEL ATTACH TYPE I PRELIM

EWA No. 5595-1

Panel or Specimen No. 1477

Tape No. 18

Tape Channel 3

Mic. No. 2

Elapsed Test Time

Mic. RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No.

Tape Channel 1

Data Tape RMS Volt V_R = 0.445

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ cps

Line Amplifier Settings
For Calibration G_c = ; for Data G_d =

Lab. Gain LG =

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ =

Microphone Sensitivity
S = psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

Equivalent of Calibration for PSD Plots
$\left(\frac{P_c}{(TMG)(LG)}\right)^2$ = psi^2/cps

Analyzer Attenuator Setting db

Log Converter Setting db

Calibration Plotted at psi^2/cps

Overall Pressure Level Data

Equiv. to db SPL

RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = = psi

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT	
CHECK					1477 Mic 2	D2 80084
APR.					THE BOEING COMPANY	PAGE
APR						FIG 132

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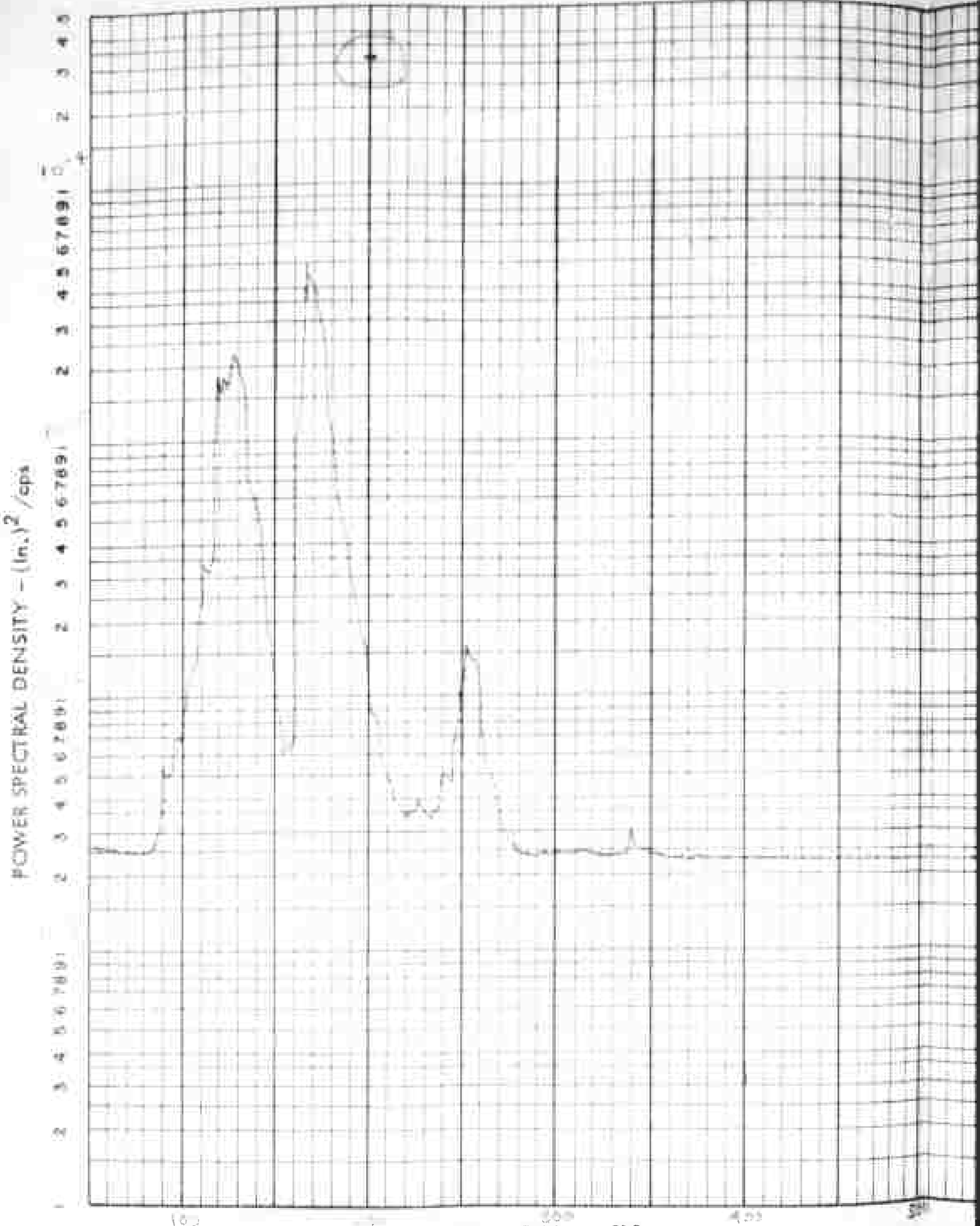
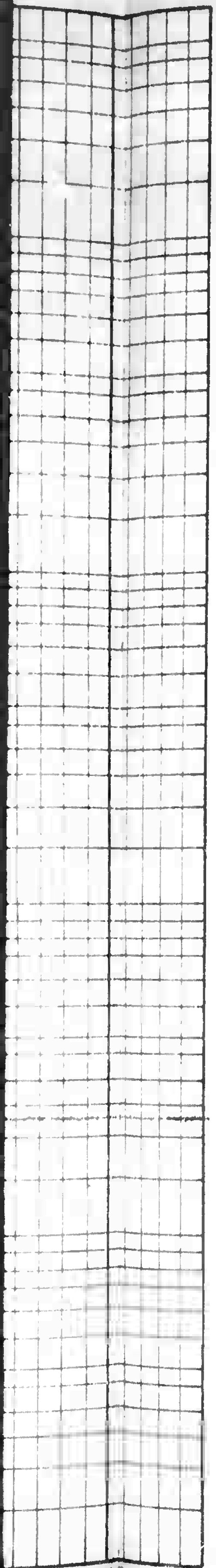


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_c 4 Sec.
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps	Loop Length 4 Sec.



DATA IDENTIFICATION

Test Title PANEL ATTACH. TYPE I PRELIM	
EWA No. 5598-1	Panel or Specimen No. 1477
Tape No. 18	Tape Channel 4
Displacement Pickup 1	
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 18	Tape Channel 1	Data Tape RMS Volt V_R = .500

Calibration Voltage
V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps;

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .2

Lab. Gain
LG = 1

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2

Displacement Pickup Sensitivity
S = 0708 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = (.5)(.0708) = .0354

Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = $\left[\frac{.0354}{2 \times 1}\right]^2$ = 3.14×10^{-4} in.^{2}/cps

Analyzer Attenuator Setting
0 db

Log Converter Setting
db

Calibration Plotted at
1.4×10^{-4} in.^{2}/cps

Overall Deflection Level of Data
RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$

= ______________ = psi

2

CALC	RES	1/16/63	REVISED	DATE
CHECK	RDS	10-2-3		
APR				
APR				

POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP

1477 P/U 1

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PAGE FIG 133

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1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps — T_c 4 Sec.

___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/sec.

___ cycles from ___ to ___ cps — Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1417	
Tape No. 18	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No.	Tape Channel	Data Tape RMS Volt V_R = [illegible]
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape [illegible] cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0708 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .5 [illegible] .0354		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = $\left[\frac{.0354}{1}\right]^2$ = 1.25 x 10⁻³ in.²/cps		
Analyzer Attenuator Setting -10 db	Log Converter Setting db	
Calibration Plotted at [illegible] 4 in.²/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ________ = psi		

2

CALC	R. F. [illegible]	9/[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP — Vol I
CHECK	[illegible]	10-2-3			1417 P/U 5 — D2-80084
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON
APR					PAGE FIG 134

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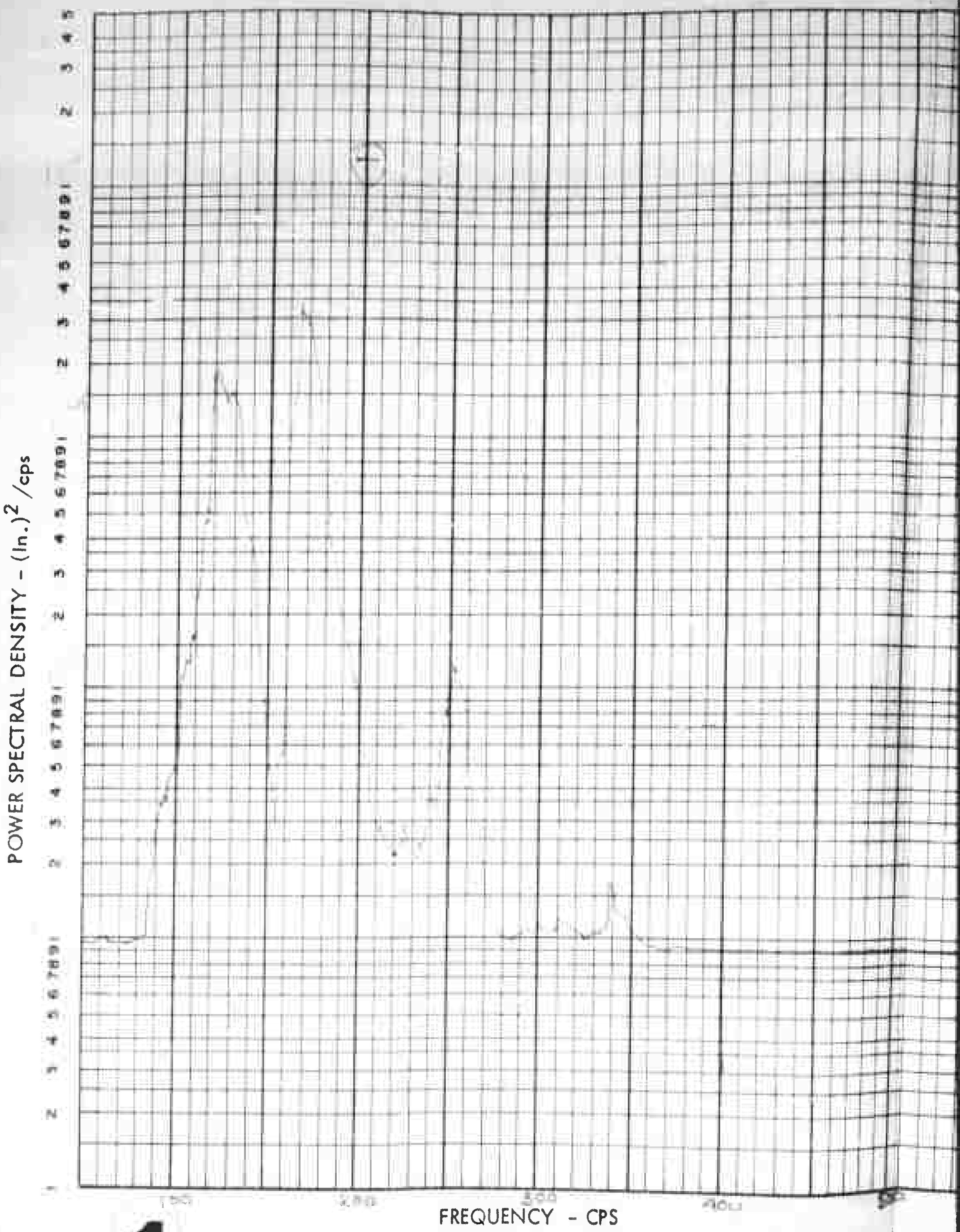


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

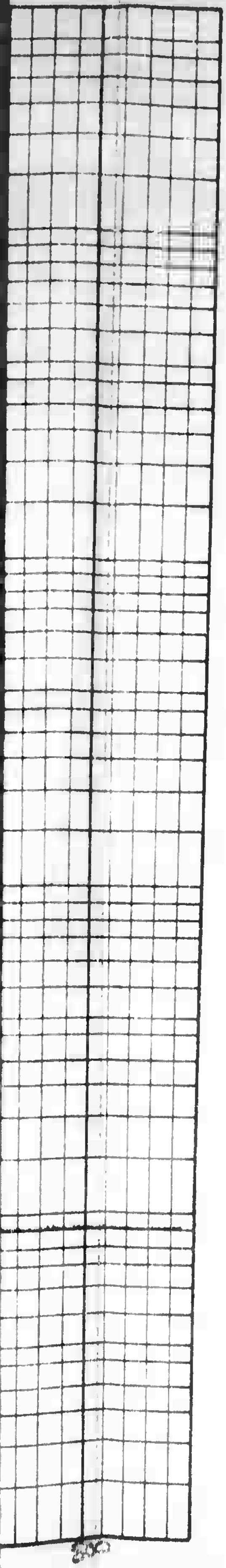
___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.



2

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM	
EWA No. 5593-1	Panel or Specimen No. 1477
Tape No. 18 / Tape Channel 6	Displacement Pickup # 6
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 18	Tape Channel	Data Tape RMS Volt V_R =

Calibration Voltage
V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps

Line Amplifier Settings
For Calibration G_c = .1 ; for Data G_d = .1

Lab. Gain LG = 1 | Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1

Displacement Pickup Sensitivity
S = .0708 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = (.5)(.0708) = .0354

Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{1 \times 1}\right]^2$ = 1.25 × 10[illegible] in.^{2}/cps

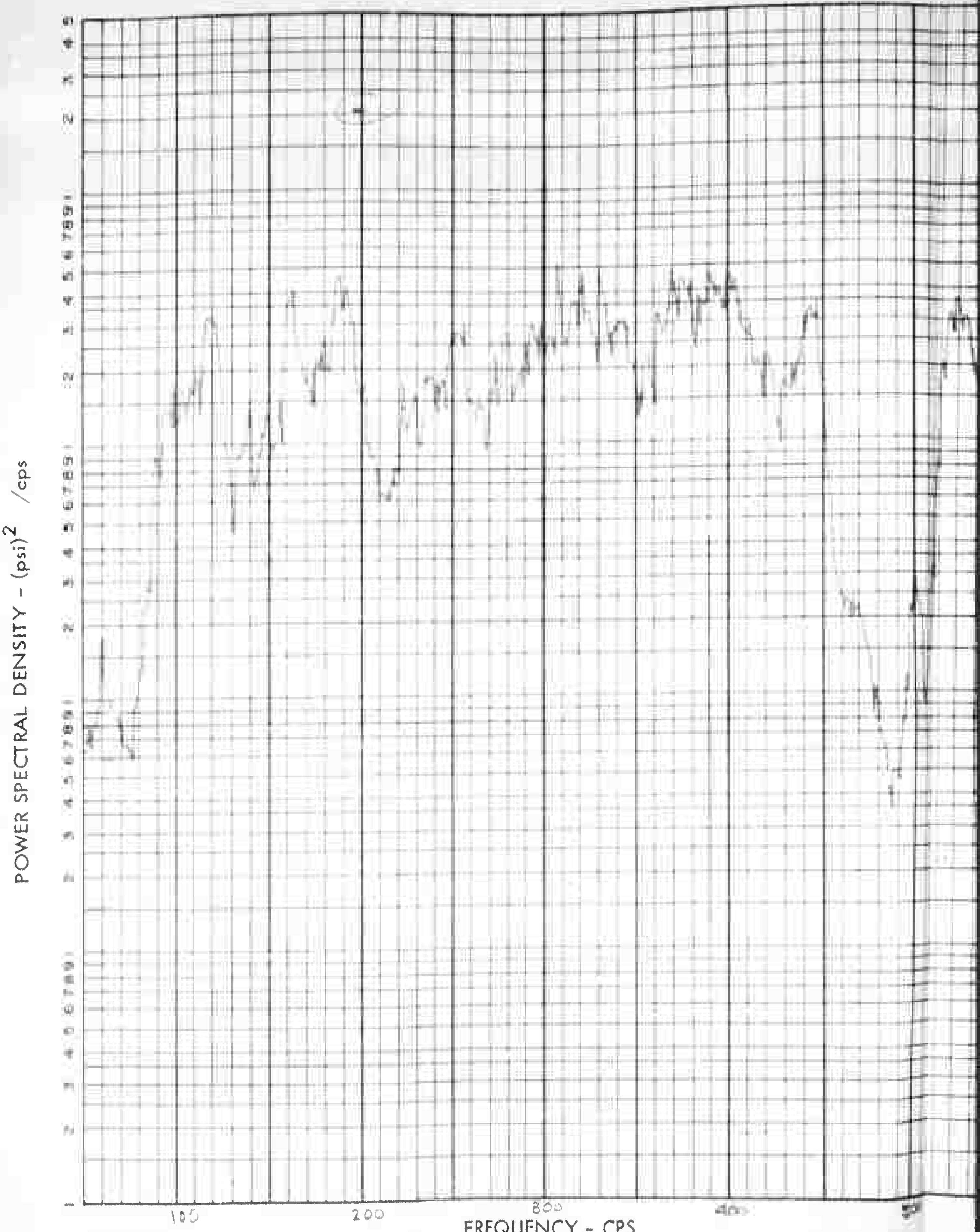
Analyzer Attenuator Setting db | Log Converter Setting db

Calibration Plotted at in.^{2}/cps

Overall Deflection Level of Data
RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ =

= ____________ = psi

CALC	RJ		REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CHECK	RDS	10-2-3				
APR.					1477 P/U 6	D2-80084
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE Fig 135

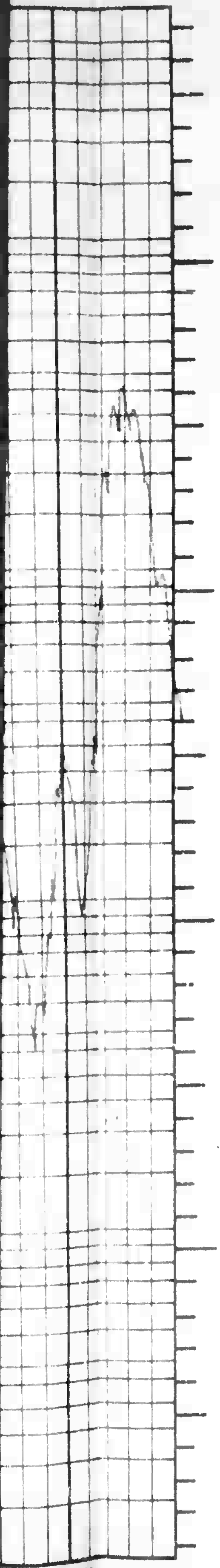


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps — Tc 4 Sec.
___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps — Loop Length 4 Sec.



SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

500

DATA IDENTIFICATION

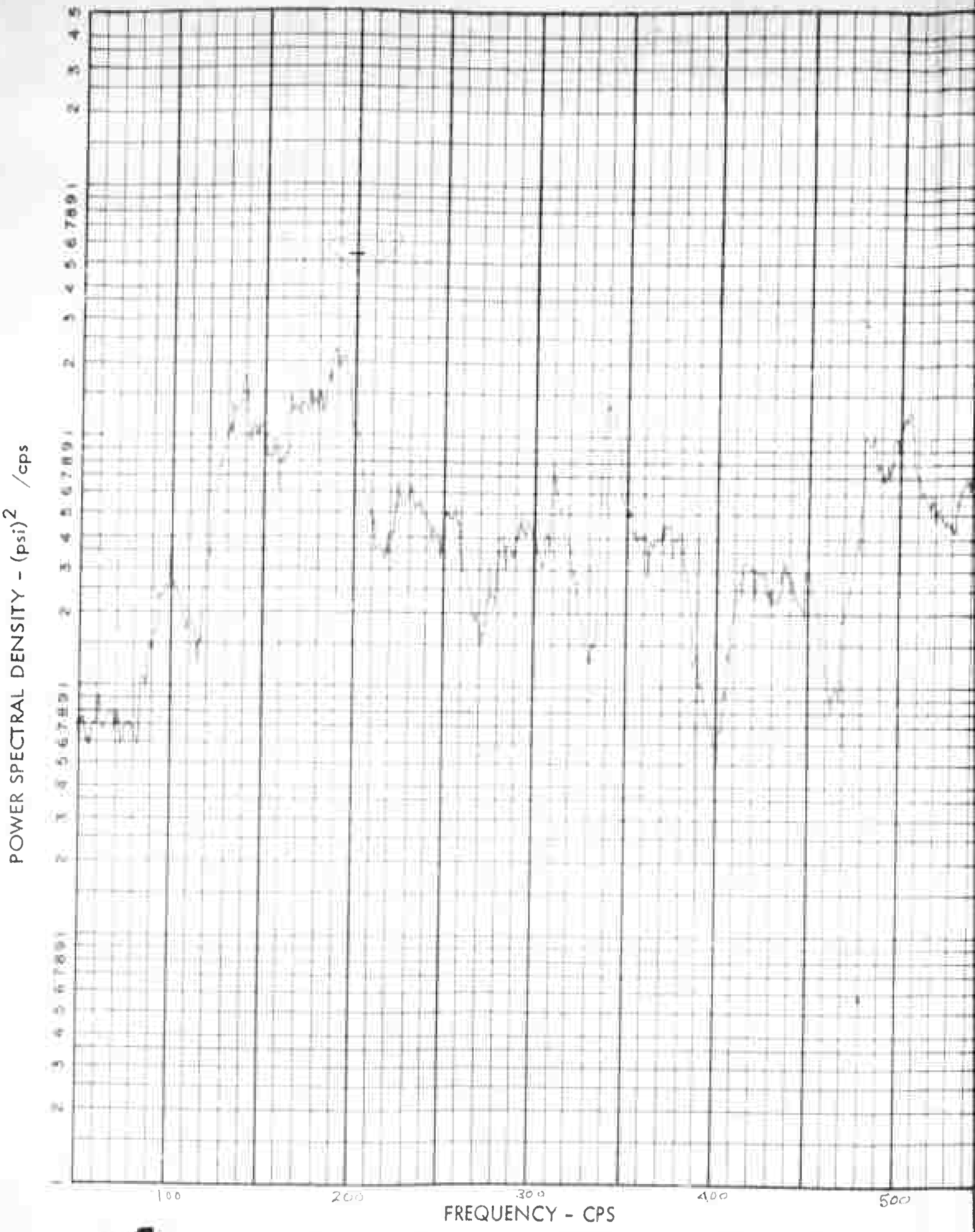
Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1477	
Tape No. 19	Tape Channel 2	Mic. No. 1
Elapsed Test Time	Mic. RMS Level at Sonic Lab. $V_L =$ Volts	

CALIBRATION

Tape No. 19	Tape Channel 1	Data Tape RMS Volt $V_R =$
Calibration Voltage $V_a = .5 V_{rms}$ into Line Amp.; $V_c =$ 5 V_{rms} on Tape @ cps		
Line Amplifier Settings For Calibration $G_c =$ .1 ; for Data $G_d =$ .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S =$ .5 ... .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 =$ ... = 2.10 x 10... psi²/cps		
Analyzer Attenuator Setting db	Log Converter Setting db	
Calibration Plotted at psi²/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = ______ = psi	Equiv. to db SPL	

2

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1477 Mic 1
CHECK	VDS				Vol. I
APR.					D2-80094
APR					THE BOEING COMPANY PAGE Fig 136



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

2

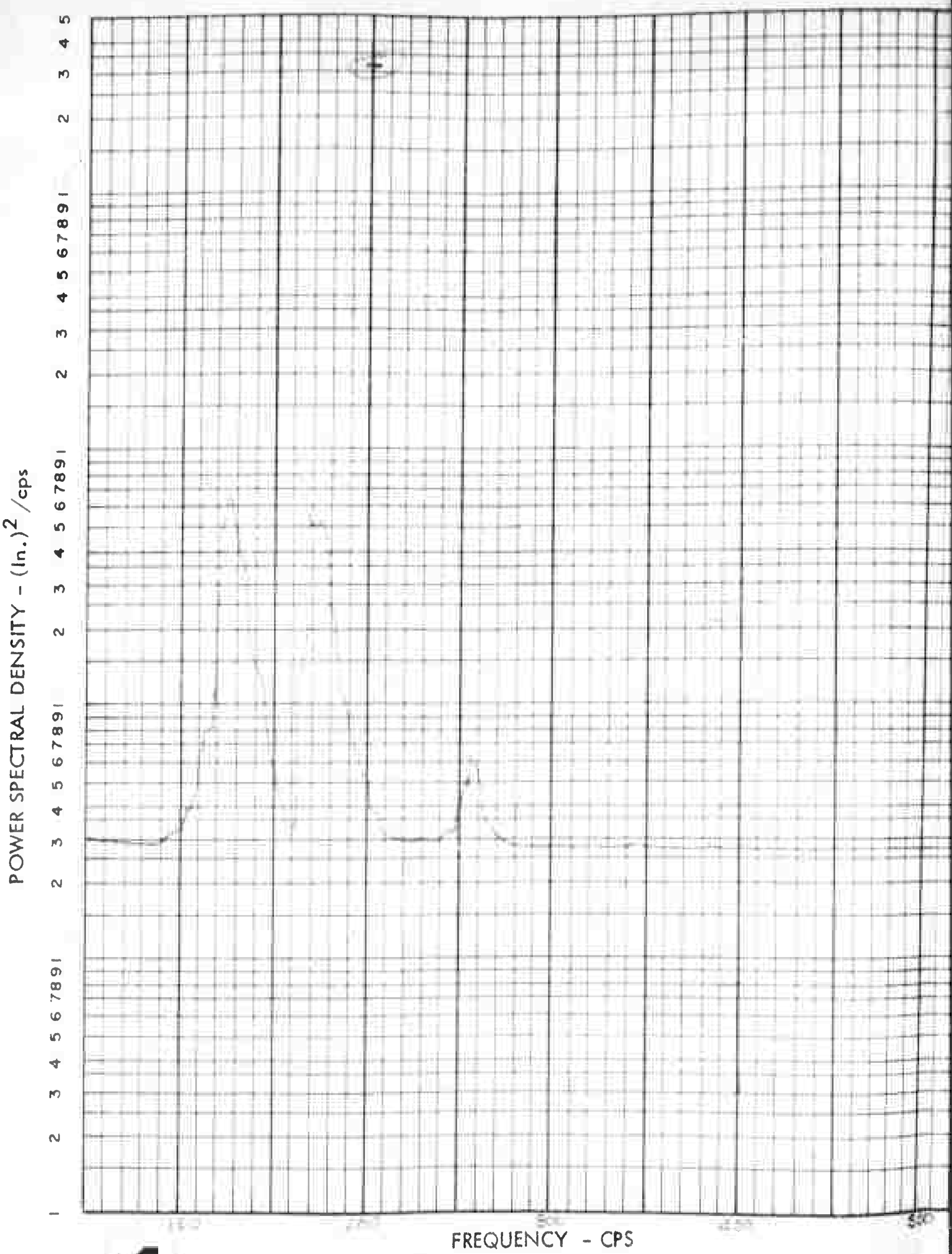
DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5593-1	Panel or Specimen No. 1477	
Tape No. 19	Tape Channel 3	Mic. No. 2
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 19	Tape Channel 1	Data Tape RMS Volt V_R = .24
Calibration Voltage V_a = 5 V_{rms} into Line Amp.; V_c = 5 V_{rms} on Tape @ cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .2		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ =	
Microphone Sensitivity S = .0?10 psi/Volt or 1 Volt rms = 16? db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = .5 . .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{2 \times 1}\right]^2$ = 5.5 x 10 psi^2/cps		
Analyzer Attenuator Setting db	Log Converter Setting db	
Calibration Plotted at psi^2/cps		
Overall Pressure Level Data RMS pressure Level $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ = = psi	Equiv. to db SPL	

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 1477 MIC 2 THE BOEING COMPANY	Vol I
CHECK	RLG	10-23				D6-60084
APR.						PAGE
APR						Fig. 137



1

ANALYSIS VARIABLES

Bandwidth
5 cycles from 50 to 550 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/sec.
Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM.	
EWA No. 5593-1	Panel or Specimen No. 1477
Tape No. 19	Tape Channel 4
Displacement Pickup # 1	
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No.	Tape Channel
Data Tape RMS Volt V_R = .150	
Calibration Voltage V_a = .5 V_{rms} Into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps	
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .2	
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2
Displacement Pickup Sensitivity S = .0108 in./Volt	
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0108) = .0054	
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = [.0054 / 2]² = [illegible] in.²/cps	
Analyzer Attenuator Setting + 10 db	Log Converter Setting db
Calibration Plotted at 3.[illegible] in.²/cps	
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ____________ = psi	

2

500

CALC			REVISED	DATE
CHECK		10-2-3		
APR.				
APR				

POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP

1477 P/U 1

THE BOEING COMPANY
SEATTLE 24, WASHINGTON

VOL I

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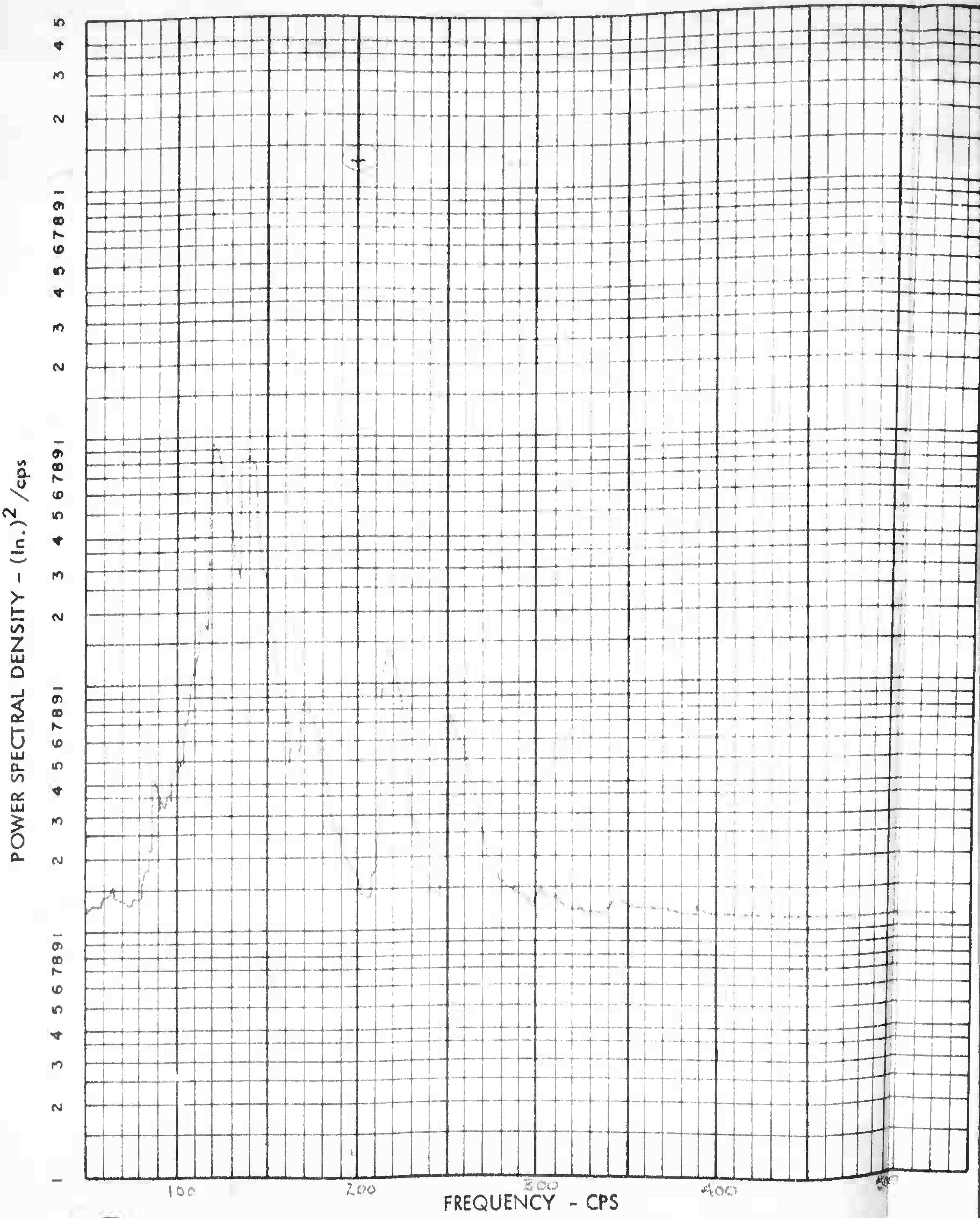
PAGE Fig 138



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_c 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM.		
EWA No. 5503-1	Panel or Specimen No. 1477	
Tape No. 19	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts	

CALIBRATION

Tape No. 19	Tape Channel 1	Data Tape RMS Volt V_R =
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape 200 cps		
Line Amplifier Settings For Calibration G_c = .1 ; for Data G_d = .1		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Displacement Pickup Sensitivity S = .0108 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = (.5)(.0108) = .0054		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0054}{(1)(1)}\right]^2$ = in.^{2}/cps		
Analyzer Attenuator Setting db	Log Converter Setting db	
Calibration Plotted at in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = = ______ = psi		

2

CALC			REVISED	DATE
CHECK	RDS	10 L 3		
APR.				
APR.				

POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP

1477 P/U. 5

THE BOEING COMPANY
SEATTLE 24, WASHINGTON

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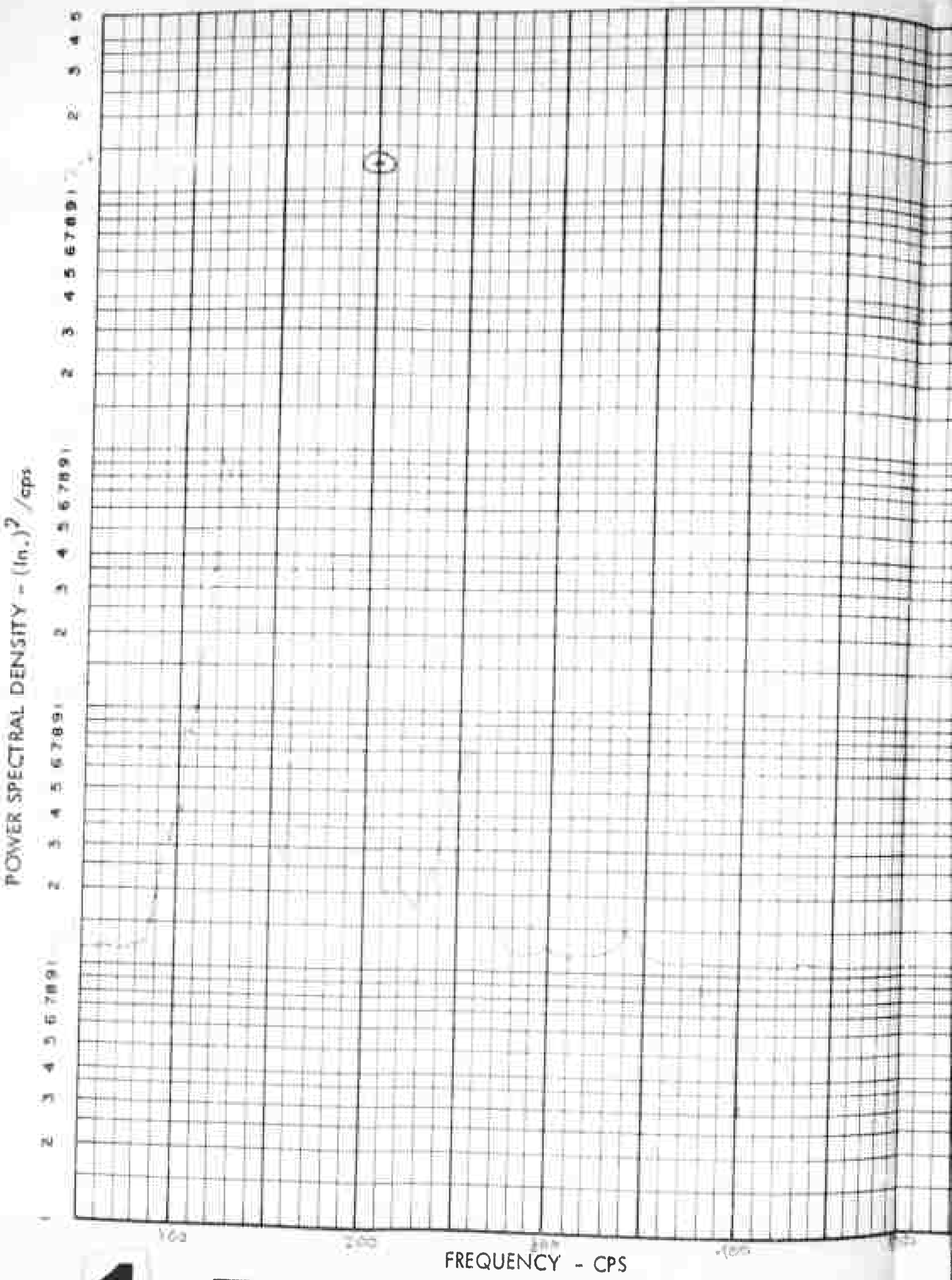
2-5353-4-38



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps

___ cycles from ___ to ___ cps

___ cycles from ___ to ___ cps

T_e 4 Sec.

Anal. Rate 1.25 cps/sec.

Loop Length 4 Sec.

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM	
EWA No. 5593-1	Panel or Specimen No. 1477

Tape No. 19	Tape Channel 6	Displacement Pickup # 6

Elapsed Test Time	P/U RMS Level at Sonic Lab. $V_L =$ Volts

CALIBRATION

Tape No. 19	Tape Channel 1	Data Tape RMS Volt $V_R =$ [illegible]

Calibration Voltage $V_a =$ .5 V_{rms} Into Line Amp.; $V_c =$ .5 V_{rms} on Tape 200 cps
Line Amplifier Settings For Calibration $G_c =$ .1 ; for Data $G_d =$ .1

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c} =$ 1

Displacement Pickup Sensitivity $S =$ .0108 in./Volt
Equivalent of Calibration - in. $D_c = V_a \cdot S =$ (.5)(.0108) = .0054
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0054}{1 \times 1}\right]^2 =$ 2.5 x 10^{-5} in.^{2}/cps

Analyzer Attenuator Setting 10 db	Log Converter Setting [illegible] db

Calibration Plotted at 1.25 x 10^{-4} in.^{2}/cps
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} =$ = ________ = psi

2

CALC	R E F	[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
CHECK	RDS	10-2-3			1477 P/U 6
APR.					THE BOEING COMPANY SEATTLE 24, WASHINGTON
APR.					

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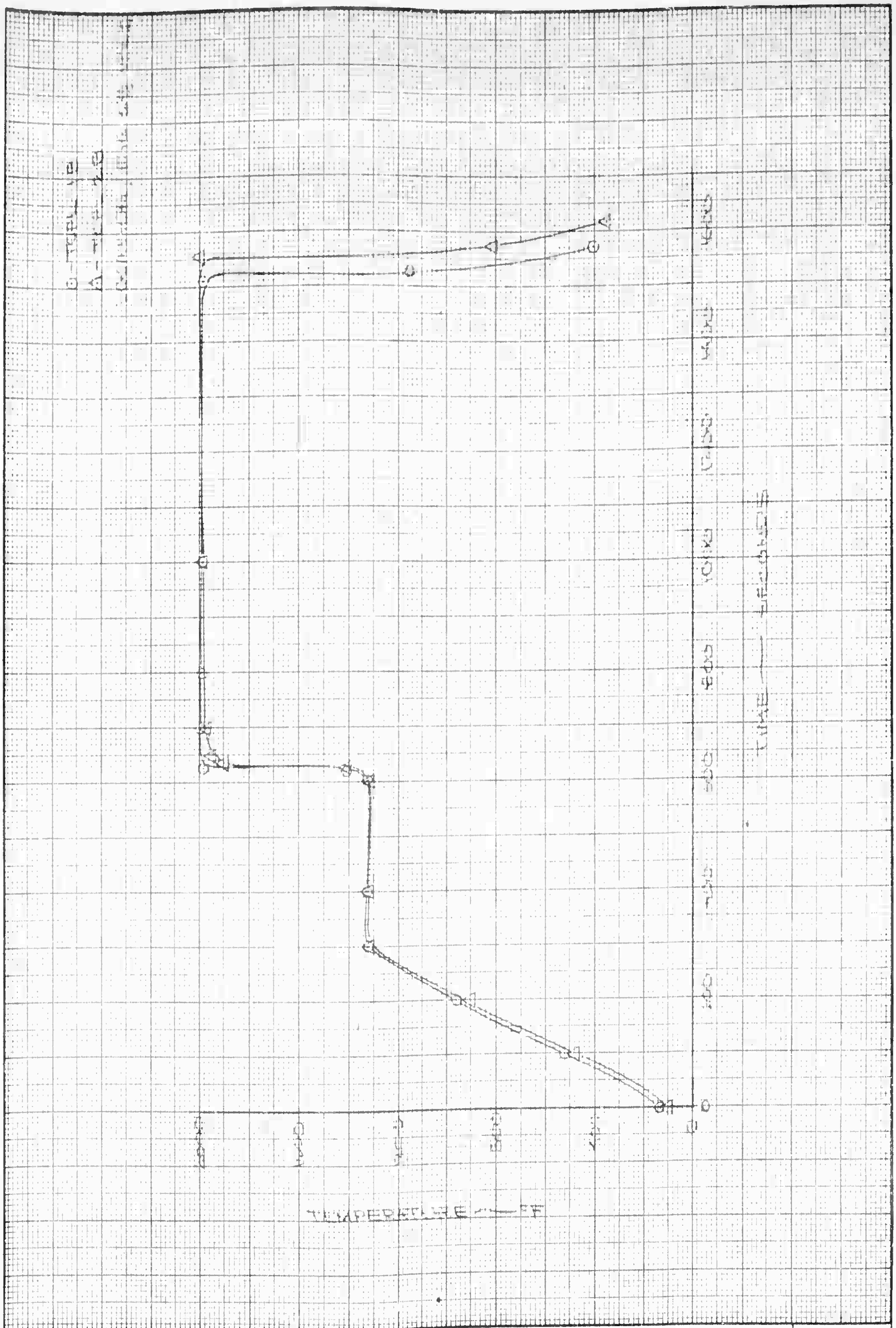
PAGE FIG 140

2-5353-4-38



CALC			REVISED	DATE
CHECK				
APR				
APR				

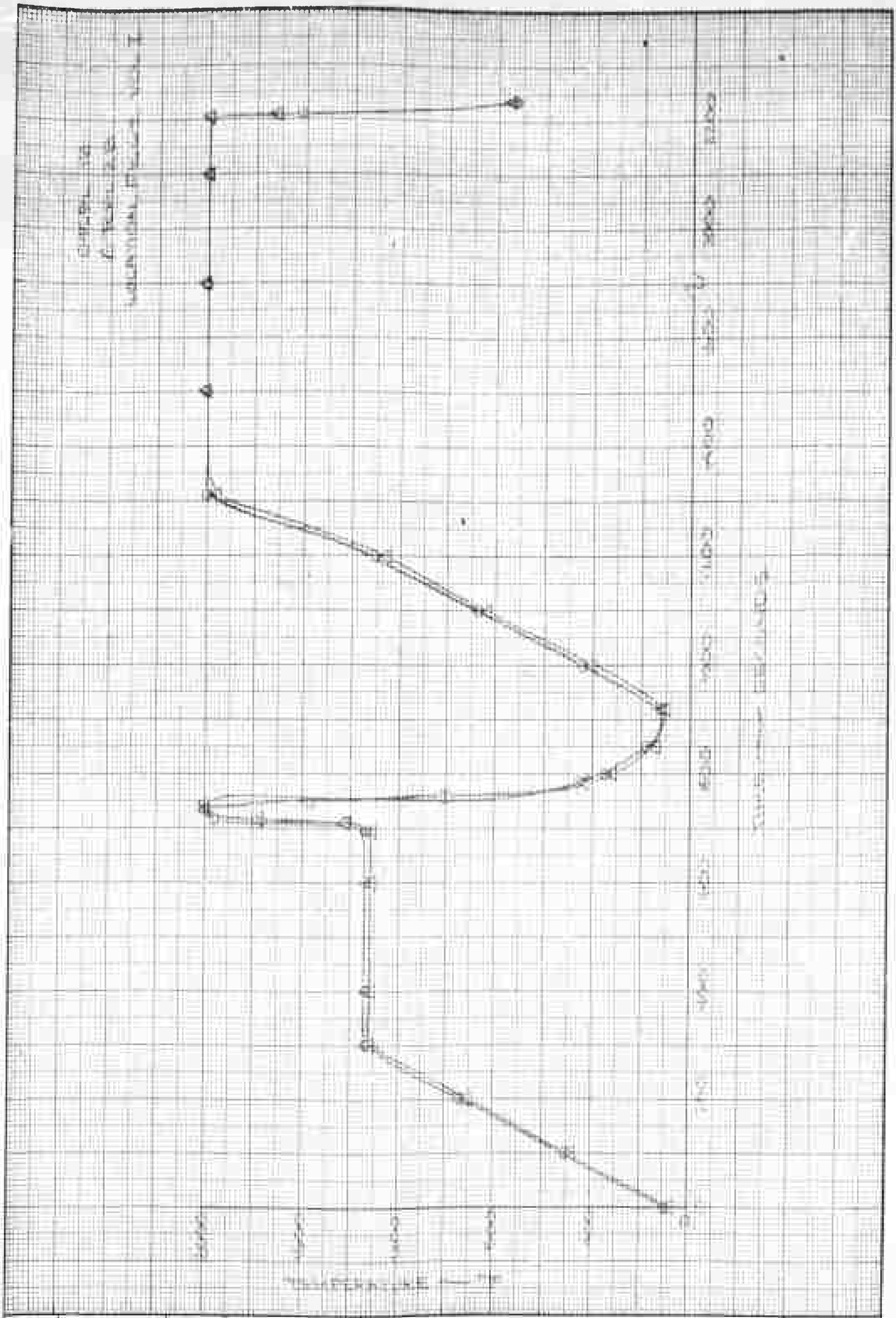
HEAT PANEL NO. 2

D2-80084

BOEING AIRPLANE COMPANY

SEATTLE 24, WASHINGTON

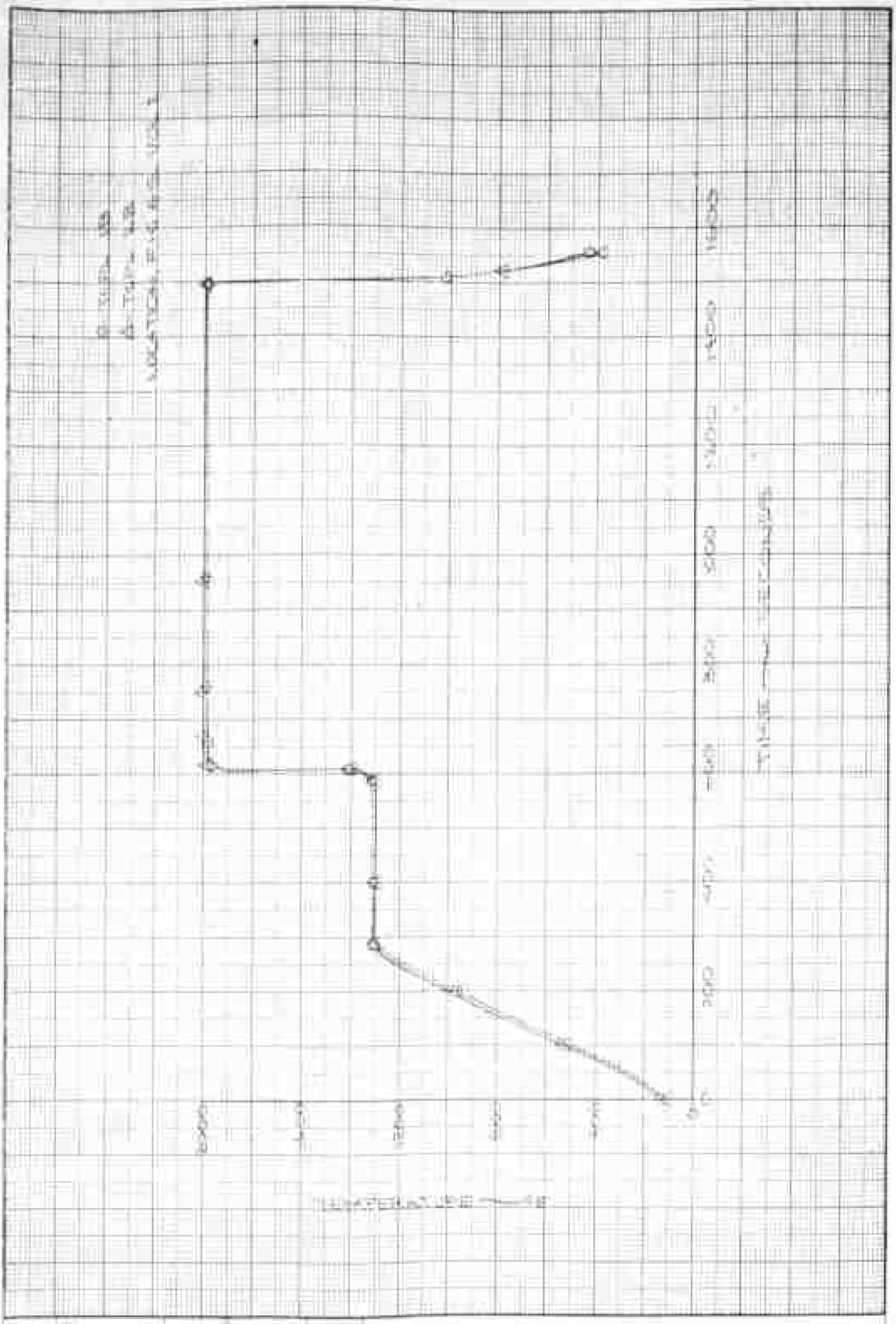
PAGE Fig 141



CALC			REVISED	DATE	... PANEL ATTACHMENT ... PANEL NO. 1		
CHECK						D2-80084	
APR							
APR					BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	PAGE	

BAC 461 C-R4

K+E ALBANENE 196L TRACING PAPER 60629



CALC			REVISED	DATE
CHECK				
APR				
APR				

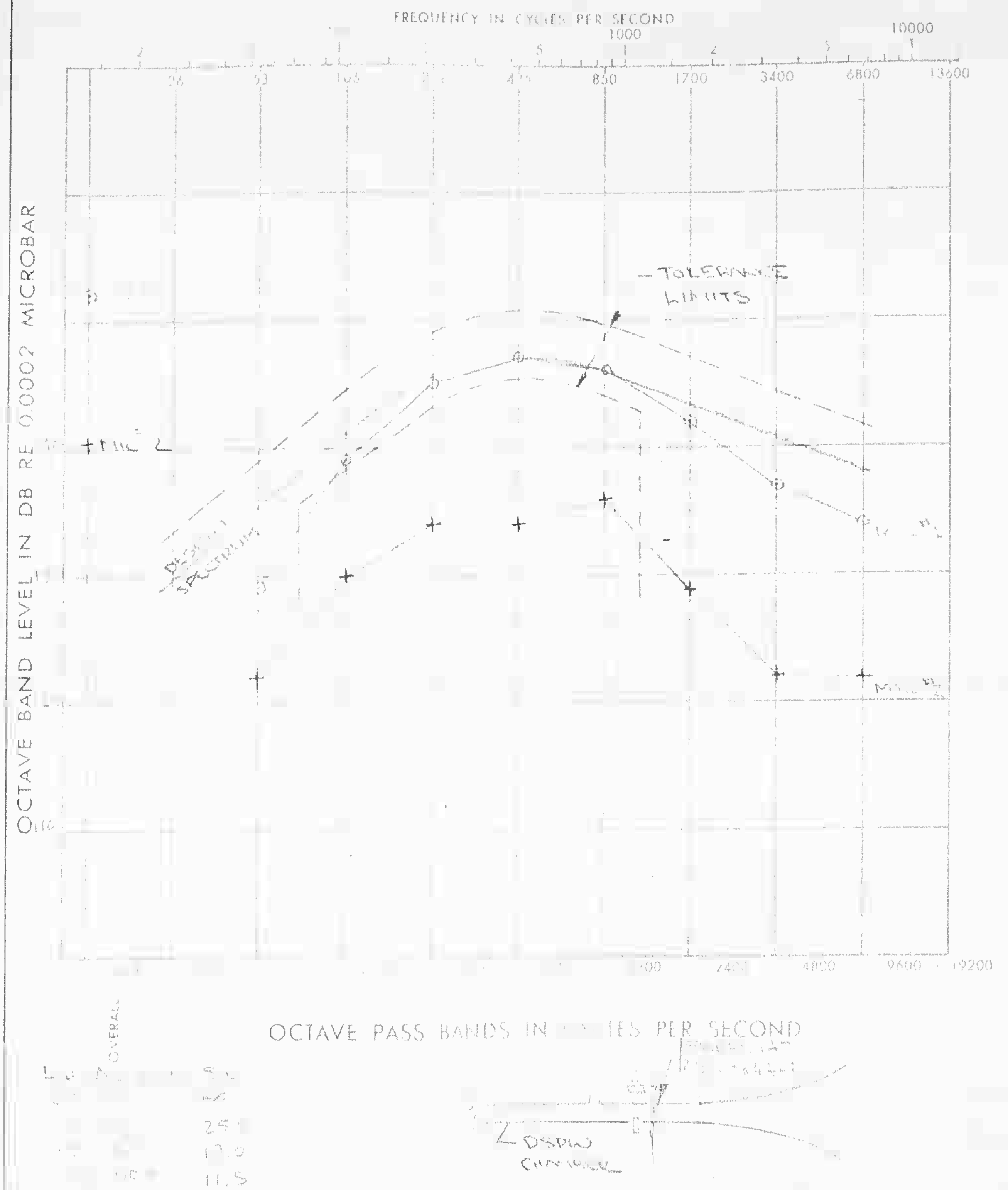
BOEING AIRPLANE COMPANY

D2-80084

BAC 461 C-R4

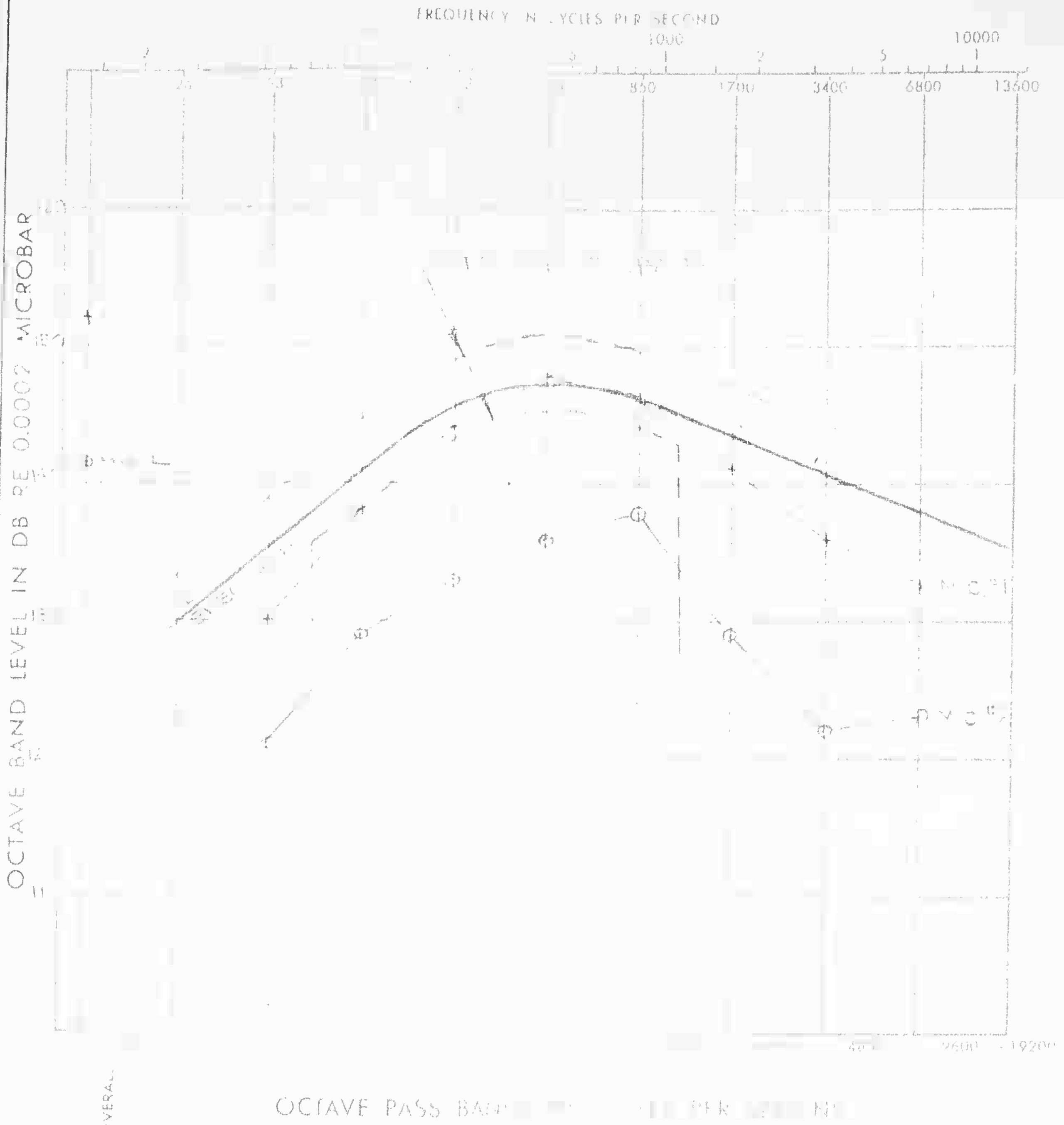
K+E ALBANENE 195L TRACING PAPER

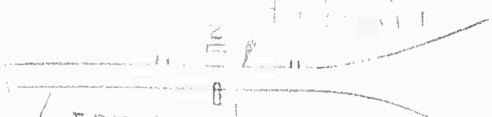
60629



1.25

PANEL # 1477 SOUND SPECTRUM
AFTER 1000° HEAT TEST
BEFORE 55 MIN. TEST
EWA 5593-1 12-22-60

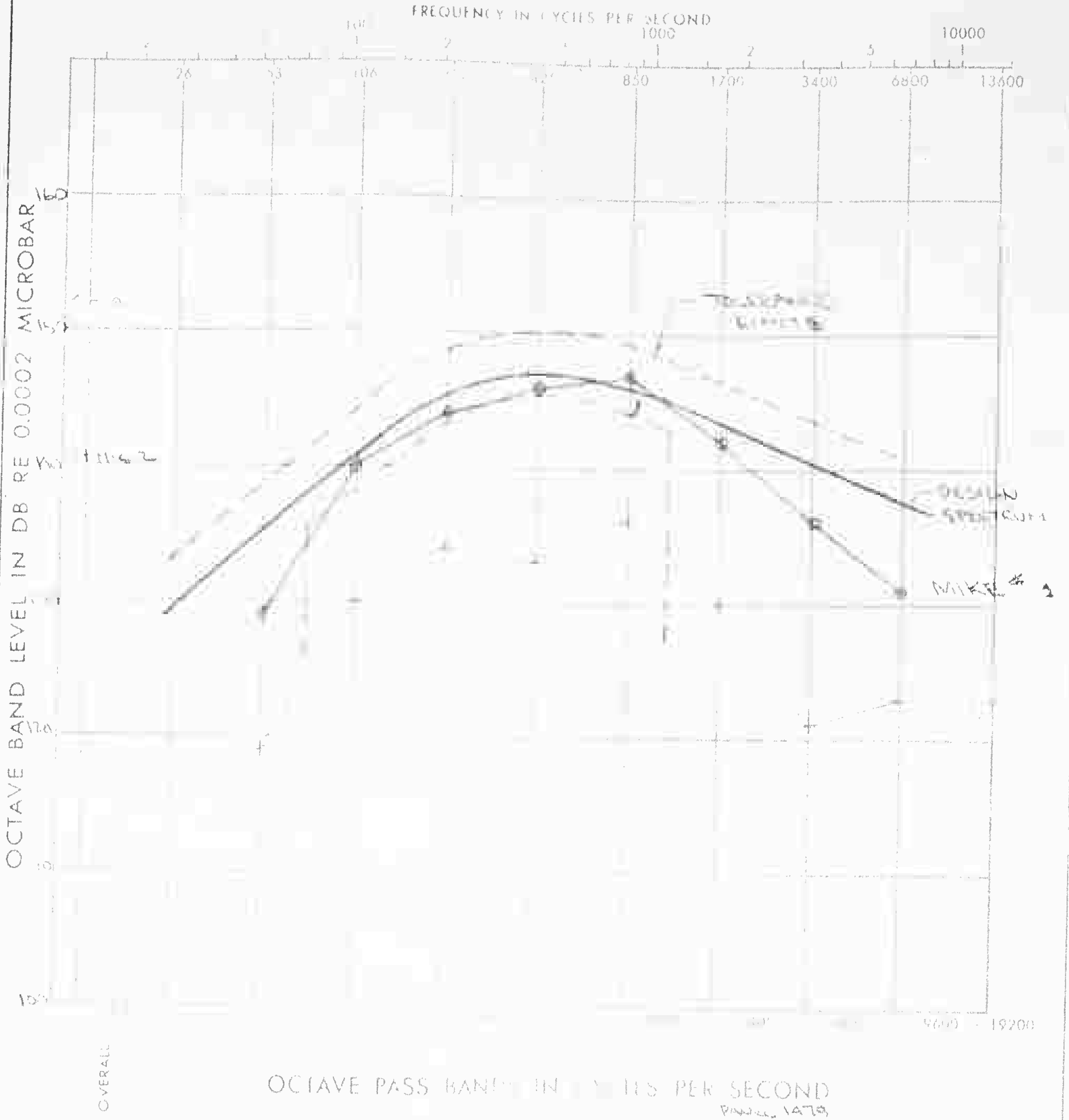


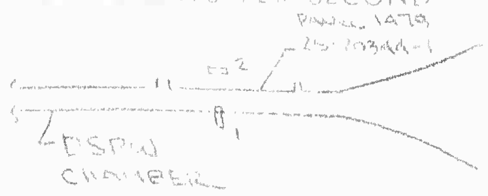


20 15	σ
75 150	25 5
150 [illegible]	19 [illegible]
300 600	10 [illegible]
600 1200	1 5
1200 2400	1 [illegible]
2400 4800	[illegible]
4800 9600	[illegible]

PANEL # 1478 SOUND SPECTRUM
AFTER [illegible] HEAT TEST
BEFORE 55 MIN [illegible]
[illegible] 5593-1 12-21-[illegible]

VOL I





EQUALIZER SE...

20-75 ∞
75-150 25.5
150-300 19.0
300-600 10.0
600-1200 1.5
1200-2400 -1
2400-4800 ∞
4800-9600 ∞
9600-19200 ∞

4.25 amps 50 psi

PANEL # 1479 SOUND SPECTRUM
AFTER 2000° HEAT TEST
BEFORE 50 MIN. TEST
EWA 5593-1 12-20-60

PANEL NO. [illegible]

Total Test Time		Test Time	Freq.	[illegible]	Sound Level	Panel Double Amplitude		Remarks
Hrs	Min	Min	cps		db	Inches		
0	5	[illegible]	[illegible]		[illegible]	—		NO [illegible]
0	20	15	"		152	—		NO NEW FAILURE
0	40	20	"		153	—		" " "
1	[illegible]	25	"		[illegible]	—		[illegible] LOOSE [illegible] NO NEW METAL FAILURE

[illegible] 5.5 [illegible]

TEST LOG

DSPW 190 db Cell

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FIG. 147

BAC 1017 [illegible]

PANEL NO. 149A

Total Test Time		Test Time	Freq.	Horn Chamber Press	Sound Level	Panel Double Amplitude		Remarks
		Min.	cps		db	Inches		
Hrs	Min	5	RANDOM	3.5	152	—		NO VISIBLE FAILURE
0	5							
PANEL DESTROYED DURING HEAT LABS PHASE OF TEST								

CALC	D.E.	5/3/61	DS PANEL 149A EWA 5F-573 TEST LOG	DSPW-190 Cell	VOL I
CHECK					D2-80054
APR					
APR				Fig 148	

PANEL NUMBER 1495

Total Test Time		Test Time	Freq.	Horn Chamber Press	Sound Level	Panel Double Amplitude		Remark
Hrs	Min	Min.	cps		db	Inches		
0	5	5	RANDOM	—	152	—		NO VISIBLE FAILURE (2/24/61)
0	30	25	"	—	152	—		NO NEW FAILURE
1	00	30	"	—	152	—		" " "

CAL	AB	5/8/61	D. S PANEL 1495 TEST LOG	VOL I D2-80084
CHECK				
APR				
APR				

Fig. 149

PANEL NO. 1477

Total Test Time		Test Time	Freq.	Horn Chamber Press	Sound Level	Panel Double Amplitude		
Hrs	Min	Min.	cps		db	Inches		
		5	RANDOM	40	152	—		NO VISIBLE FAILURE
0	5							[illegible]
								[illegible]
		15	RANDOM	40	152	—		[illegible]
0	20							[illegible]
		20	RANDOM	40	[illegible]	—		
0	40							
		20	RANDOM	40	[illegible]	—		NO VISIBLE FAILURES
0	60							
		0.5	"	40	157	—		
0	60.5							
		0.5	"	40	162	—		NO VISIBLE FAILURES
0	61.0							

CAL	A.B.	5/9/61	D.S. PANEL 1477
CHECK			FWA 5-593 TEST LOG
APR			DSFW 190 db.
APR			FIG 150

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BAC 1017 KS

PANEL NUMBER 1478

Total Test Time Hrs	Total Test Time Min	Test Time Min.	Freq. cps	Horn Chamber Press	Sound Level db	Panel Double Amplitude Inches		Remarks
0	05	5	Random	40	152	—		NO VISIBLE FAILURE
0	25	20	RANDOM	40	152	—		LOOSE [illegible] FRAY ON CORRUGATIONS
0	45	20	RANDOM	40	152	—		LOOSE FIBER FRAY ON CORRUGATION
0	60	15	RANDOM	40	152			LOOSE FIBER FRAY ON CORRUGATION
0	60.5	0.5	RANDOM	40	157			NO CHANGE
0	61.0	0.5	RANDOM	40	162			NO CHANGE

CALC [illegible] | CHECK | APR | APR

D3-1 PANEL 1478

[illegible] 1478 ~ TEST LOG

FIG 151

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D2-80084

TAC 1017 R5

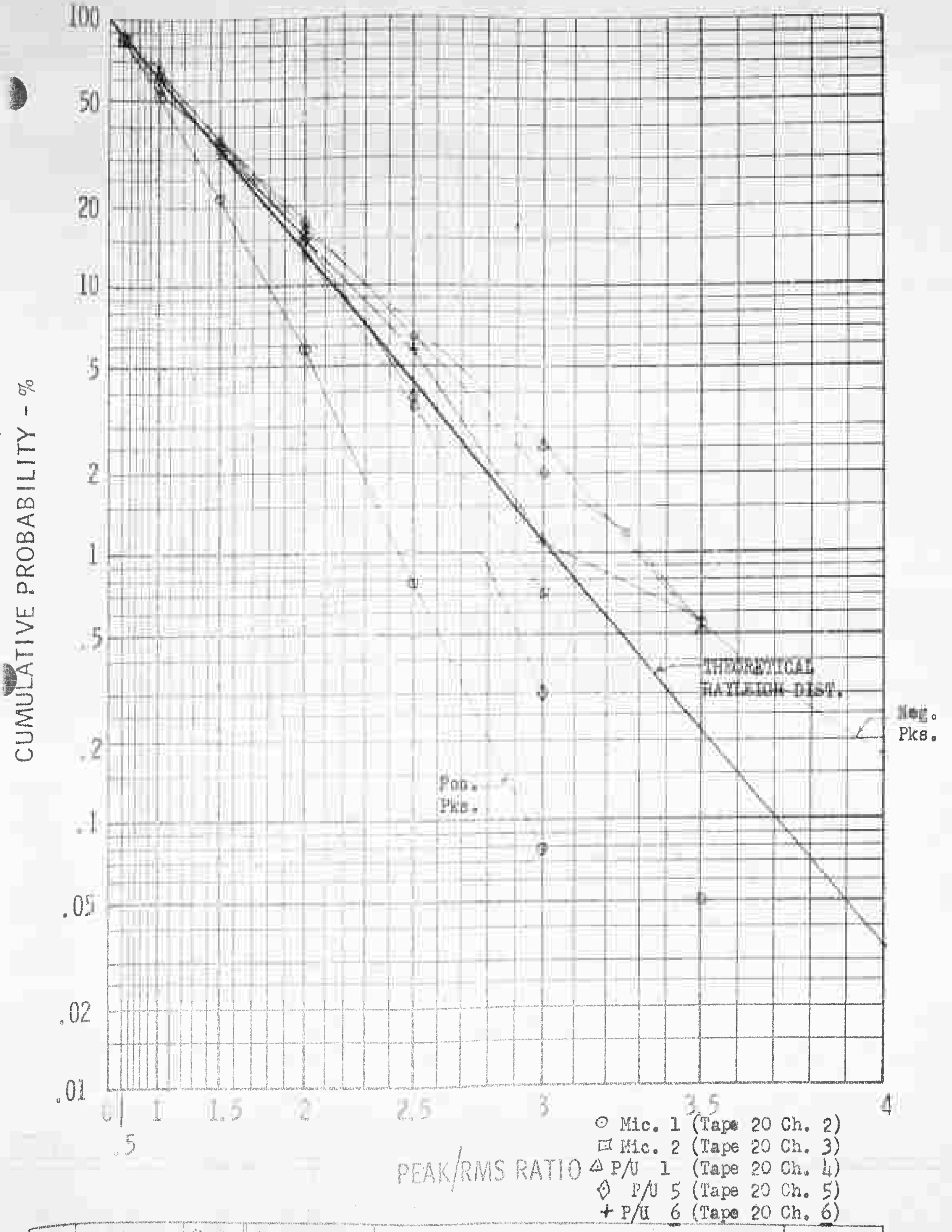
PANEL NUMB. 1499

Total Test Time		Test Time	Freq.	Horn Chamber Press	Sound Level	Panel Double Amplitud.		
Hrs	Min	Min.	cps		db	Inches		
		5	RANDOM	—	152	—		NO VISIBLE FAILURE
		5	RANDOM	40	152	—		LOOSE FIBER FRAX ON CORRUGATION
0	10	15	"	40	152	—		LOOSE FIBER FRAX ON CORRUGATION
0	25	20	"	40	152	—		LOOSE FIBER FRAX ON CORRUGATIONS
0	45	15	"	40'	152	—		LOOSE FIBER FRAX ON CORRUGATION
0	60							
		0.5	RANDOM	40	157	—		LOOSE FIBER FRAX ON CORRUGATION
0	60.5							
		0.5	RANDOM	40	162	—		LOOSE FIBER FRAX ON CORRUGATION
0	61.0							

CALC A.B. 5/10/61	PANEL 1499 TEST LOG	Horn DSPM 19036 Cell	Vol I D2-80084
CHECK			
APR			
APR	BOEING [illegible]	FIG 152	

36

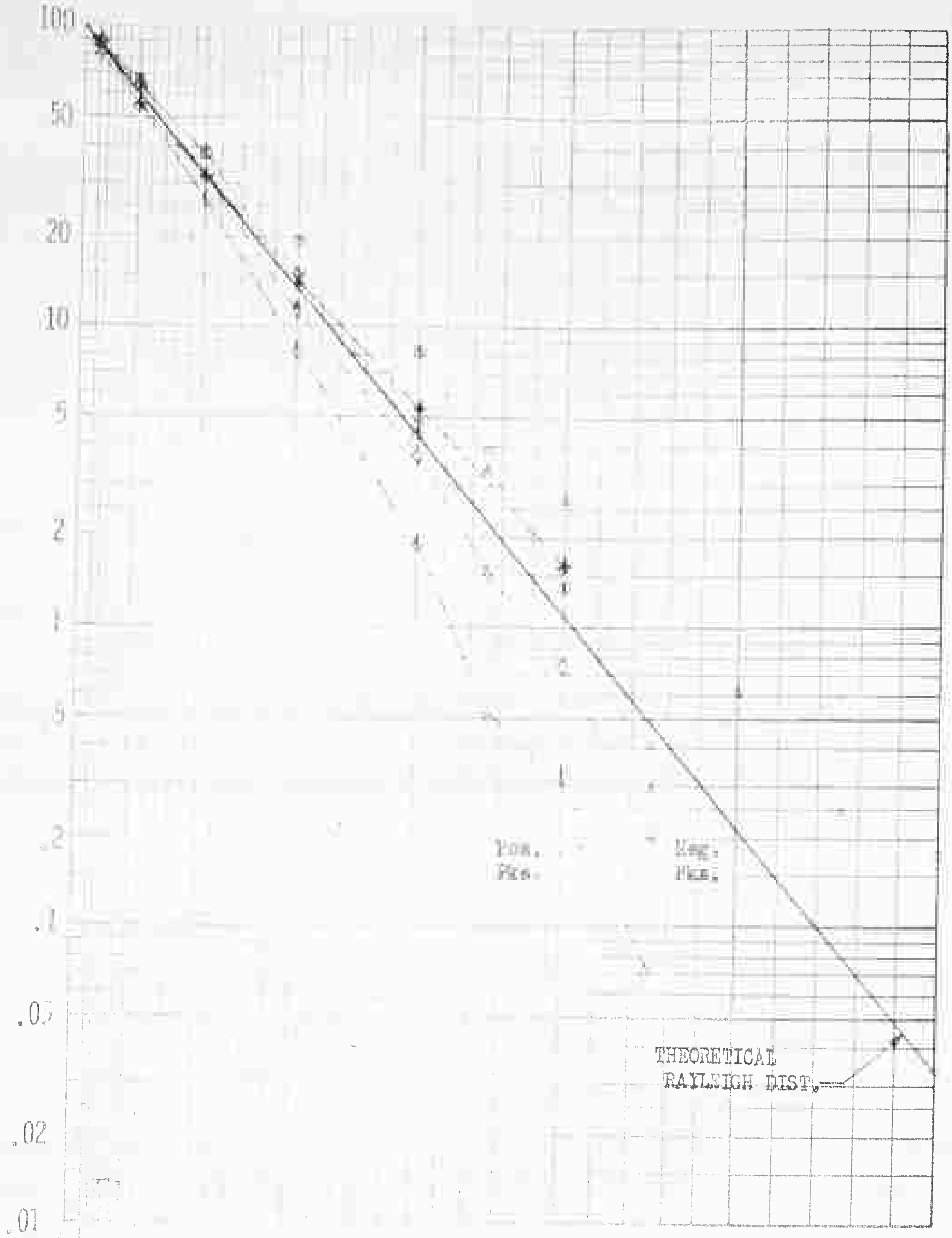
BAC 1017



CALC		REVISED	DATE	AMPLITUDE DISTRIBUTION	
CHECK				Panel 1493 Phase A	D2-3084
APPD					
APPD				BOEING AIRPLANE COMPANY	PAGE Fig 153

2-7000

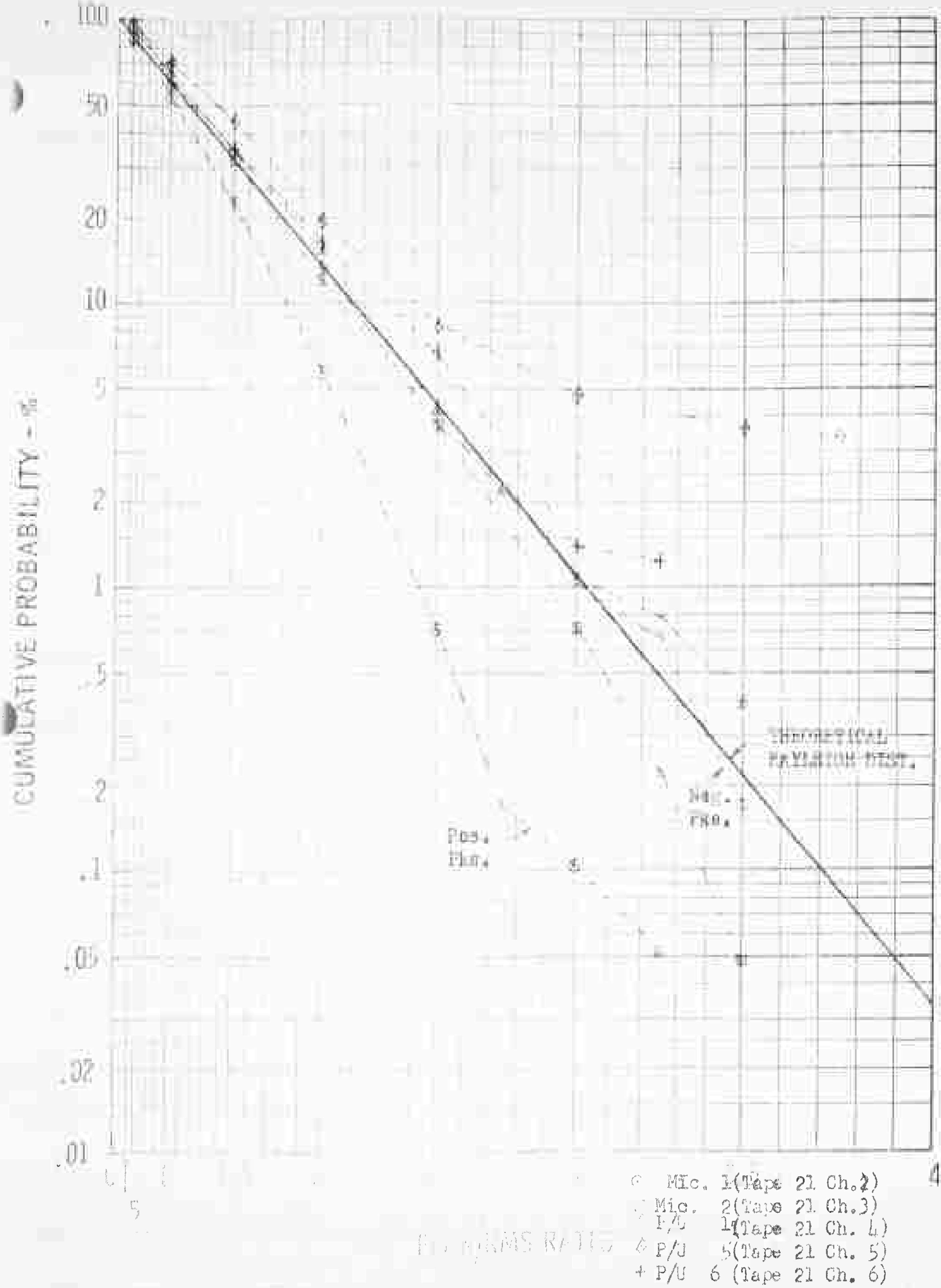
2-5353-7-1



Mic. 1 (Tape 21A Ch. 6)
Mic. 2 (Tape 21A Ch. 2)
+ P/U 1 (Tape 21A Ch. 3)
P/U 5 (Tape 21A Ch. 4)
P/U 6 (Tape 21A Ch. 5)

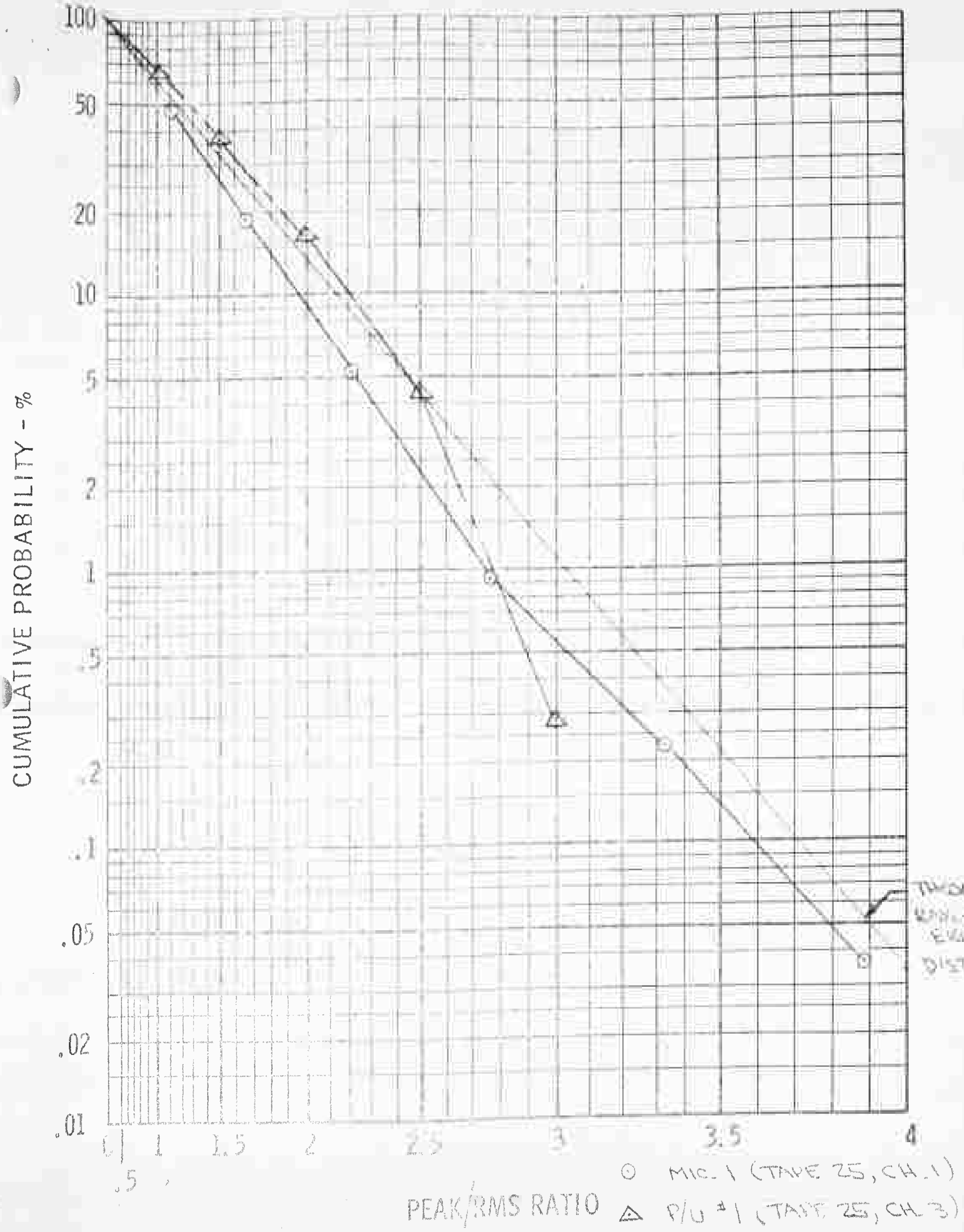
CALC	AMPLITUDE DISTRIBUTION	
CHECK	Panel 1494 Phase A	
APPD		
APPD	AIRPLANE COMPANY	

2-5353-7-1



CALC		AMPLITUDE DISTRIBUTION
CHECK		
APPD		Panel 1495 Phase A
APPD		BOEING AIRPLANE COMPANY

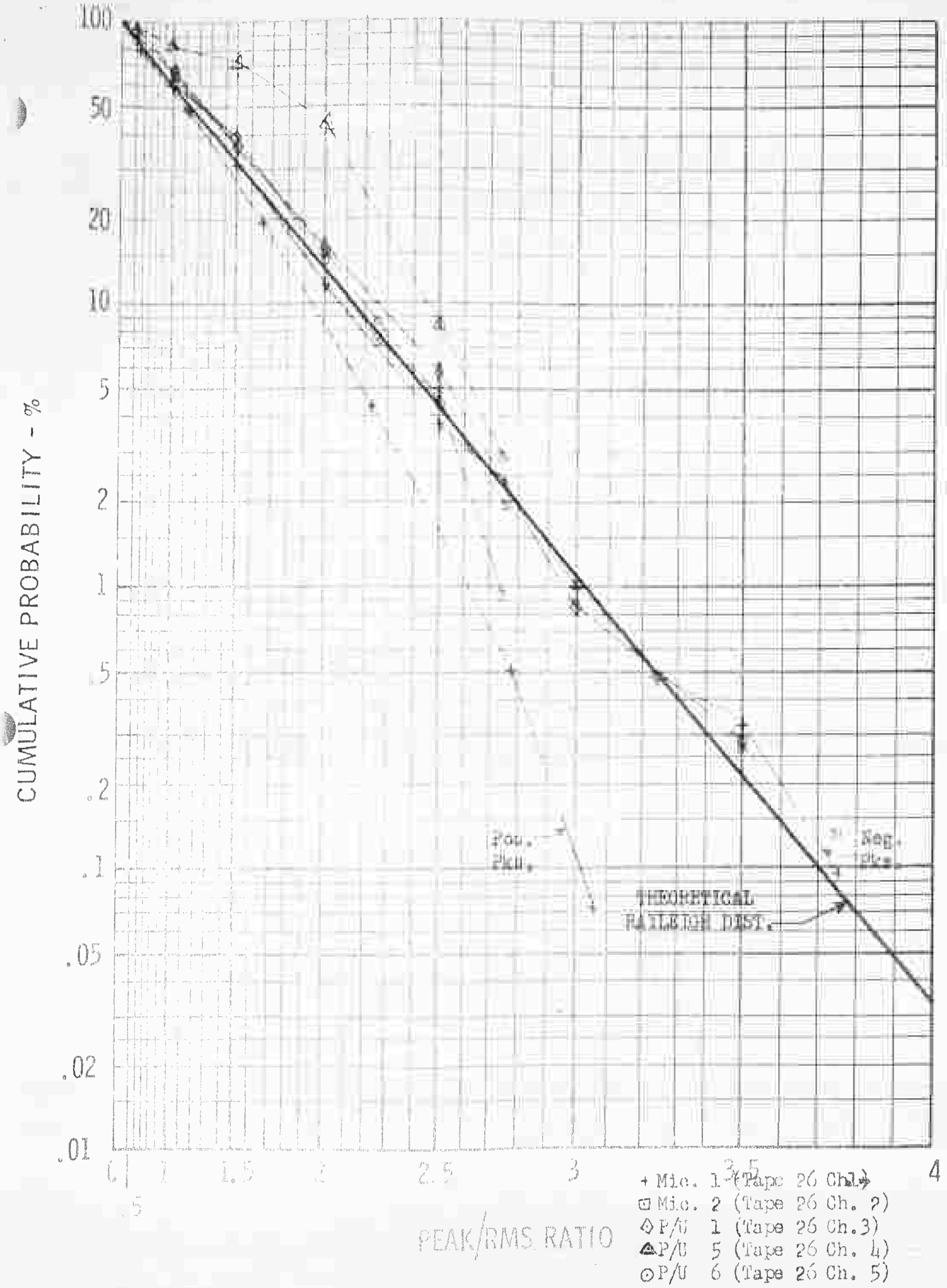
2-5353-7-1



CALC		REVISED	DATE	AMPLITUDE DISTRIBUTION	Vol. I
CHECK				PANEL 1495 PHASE B	D2 80081
APPD					PAGE
APPD				BOEING AIRPLANE COMPANY	FIG 156

2-7000

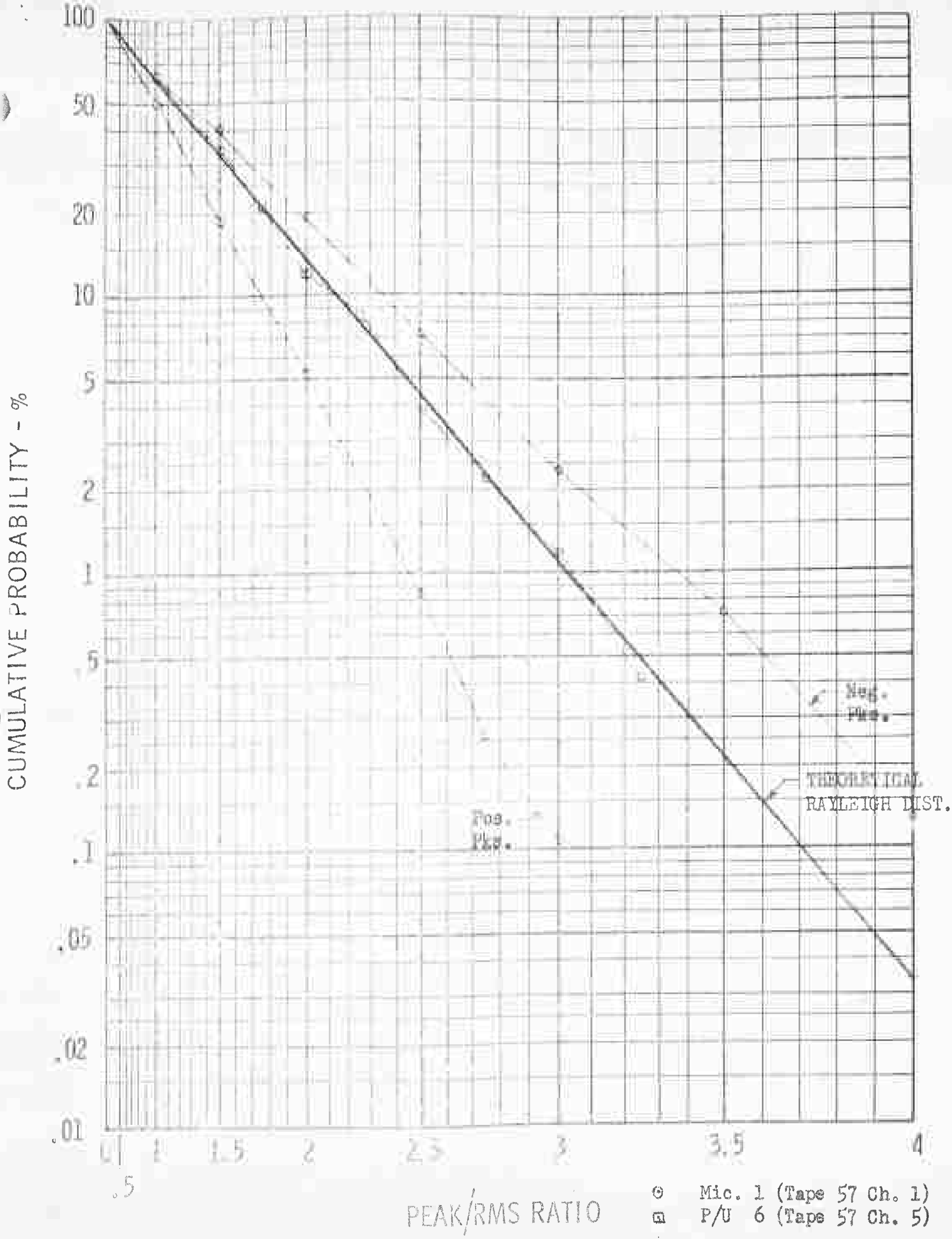
2-5353-7-1



CALC		REVISED	DATE	AMPLITUDE DISTRIBUTION	Vol I
CHECK				Panel 1497 Phase A	
APPD				BOEING AIRPLANE COMPANY	PAGE FIG 157
APPD					

2-7000

2-5353-7-1



CALC		REVISED	DATE	AMPLITUDE DISTRIBUTION
CHECK				
APPD				Panel 1497 Phase C
APPD				BOEING AIRPLANE COMPANY

VOL I
PAGE FIG 158

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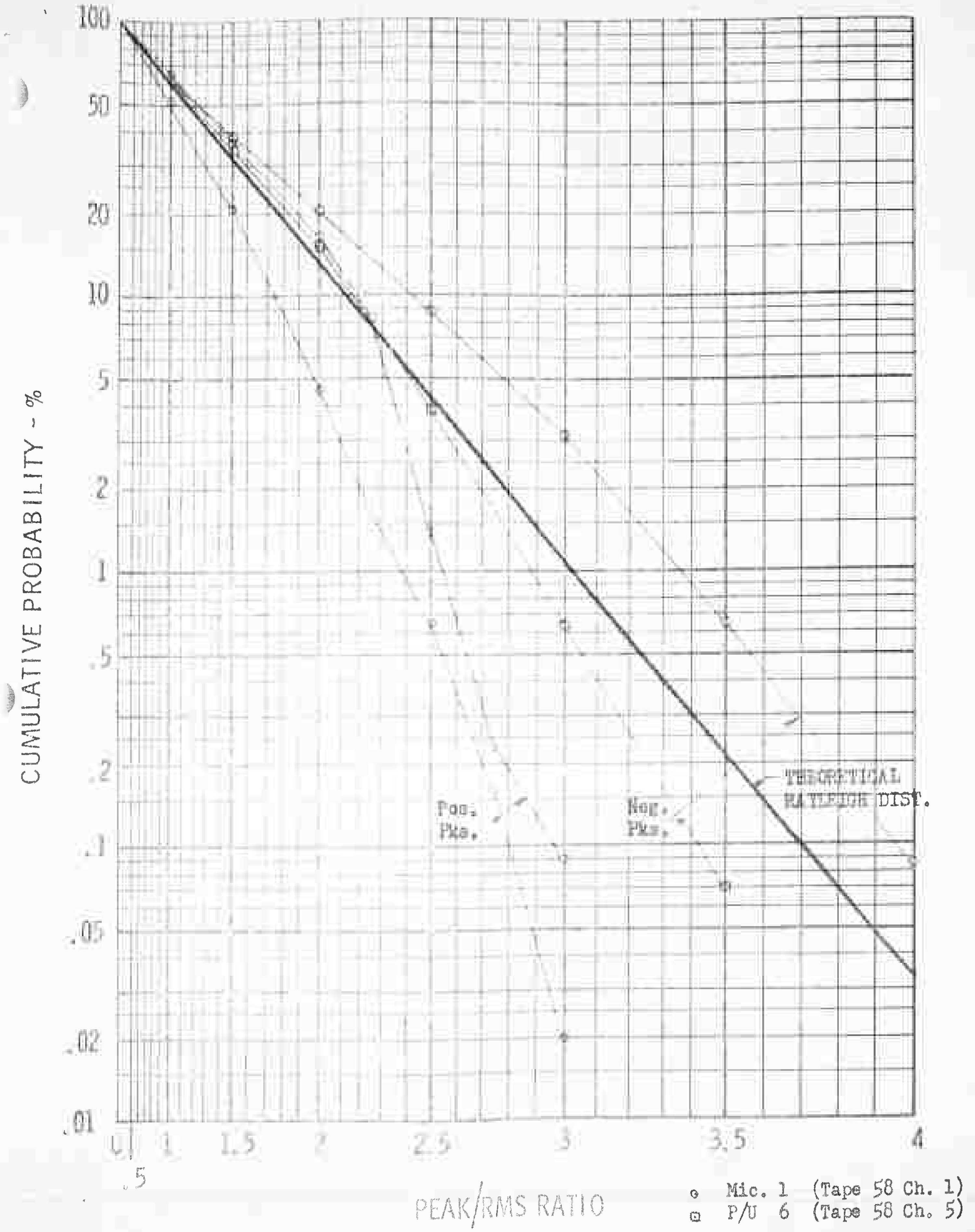
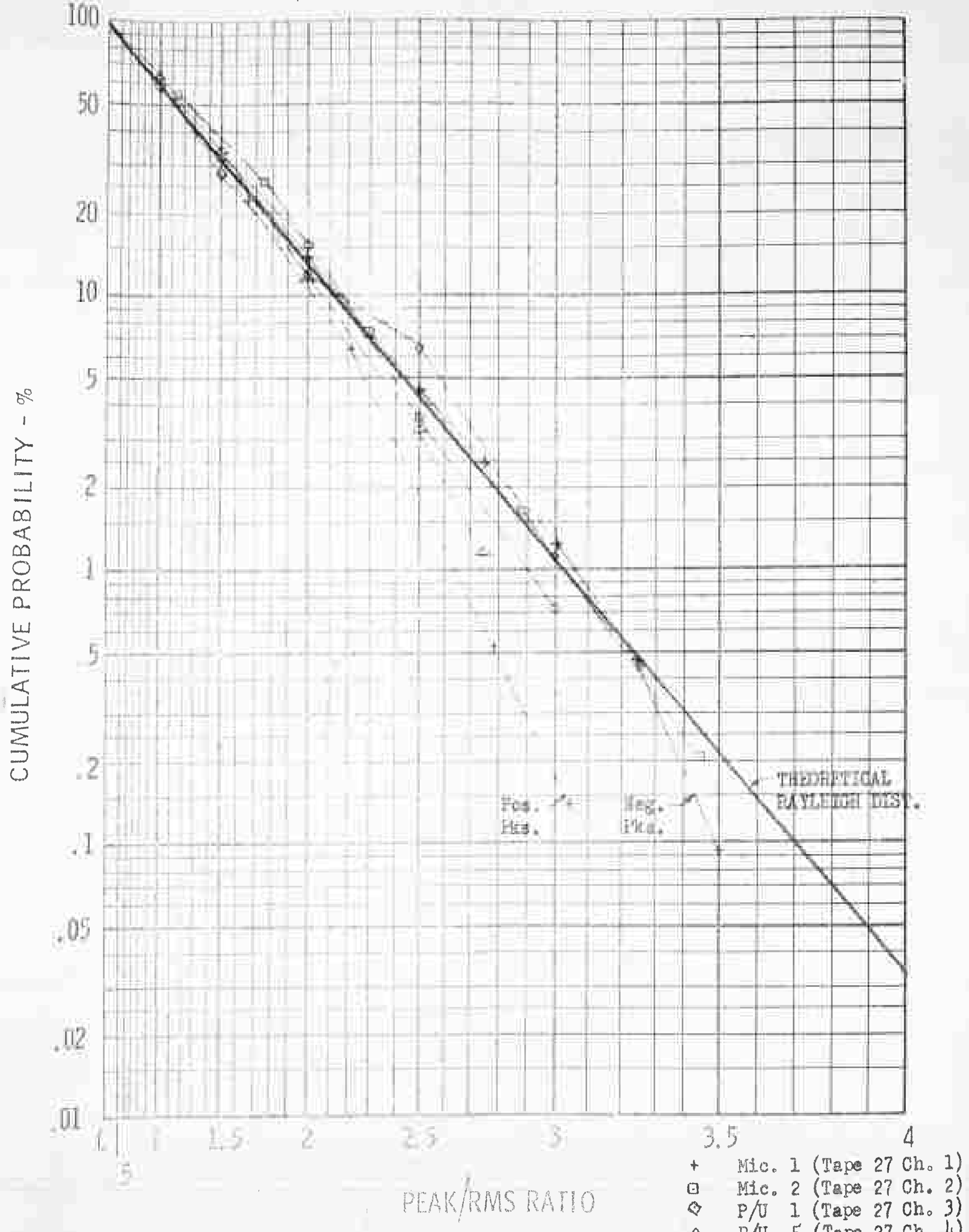
2-5353-7-1



CALC			REVISED	DATE	AMPLITUDE DISTRIBUTION	NOV 1963
CHECK					Panel 1497 Phase D	D2-9...
APPD						
APPD					BOEING AIRPLANE COMPANY	PAGE FIG 159

2-7000

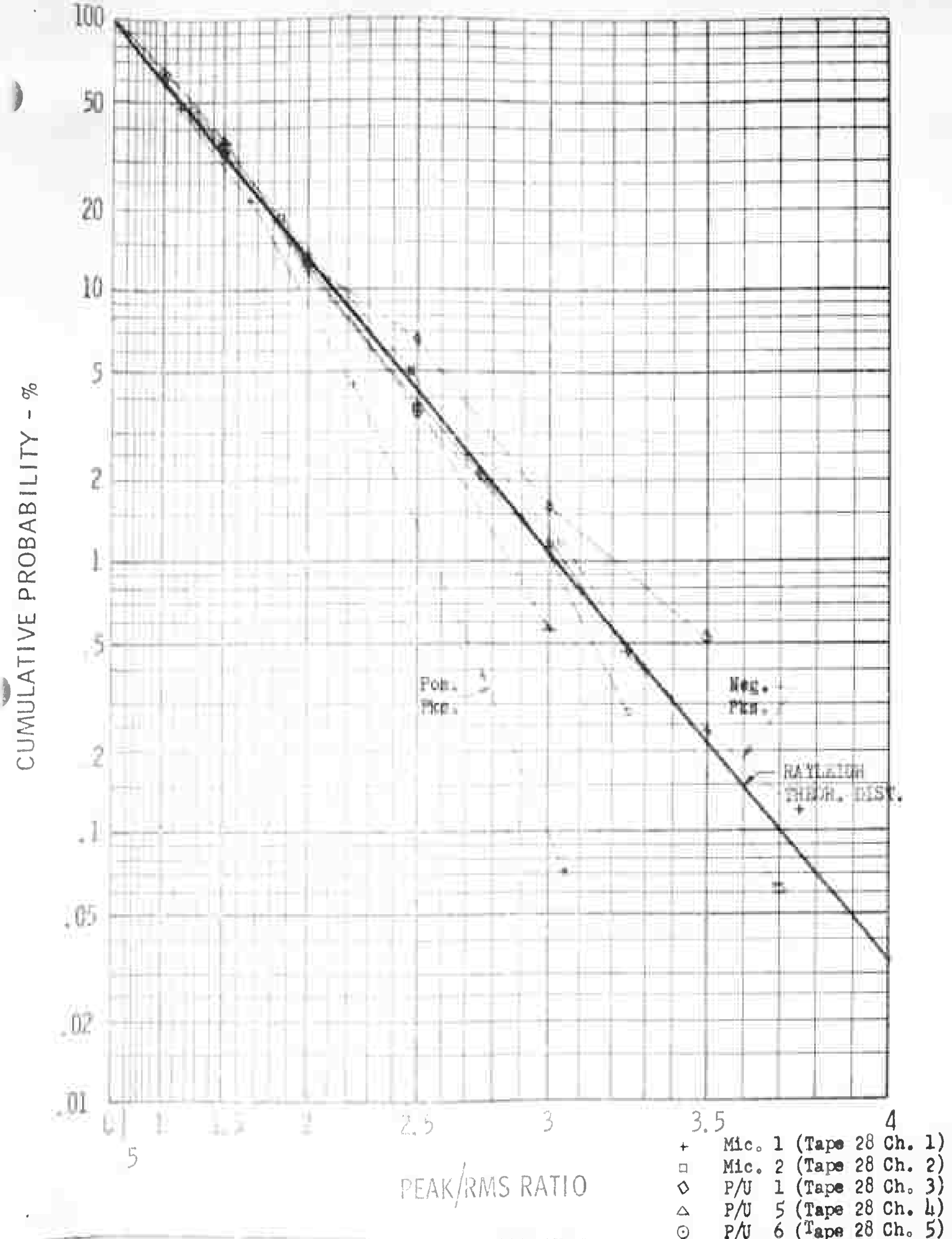
2-5353-7-1



CALC	JGA		REVISED	DATE	AMPLITUDE DISTRIBUTION	
CHECK						
APPD					Panel 1498 Phase A	
APPD					BOEING AIRPLANE COMPANY	PAGE FIG 60

2-7000

2-5353-7-1



CALC & CHECK			
APPD			
APPD			

AMPLITUDE DISTRIBUTION

Panel 1499 Phase A

BOEING AIRPLANE COMPANY

D2 ...

PAGE FIG 161

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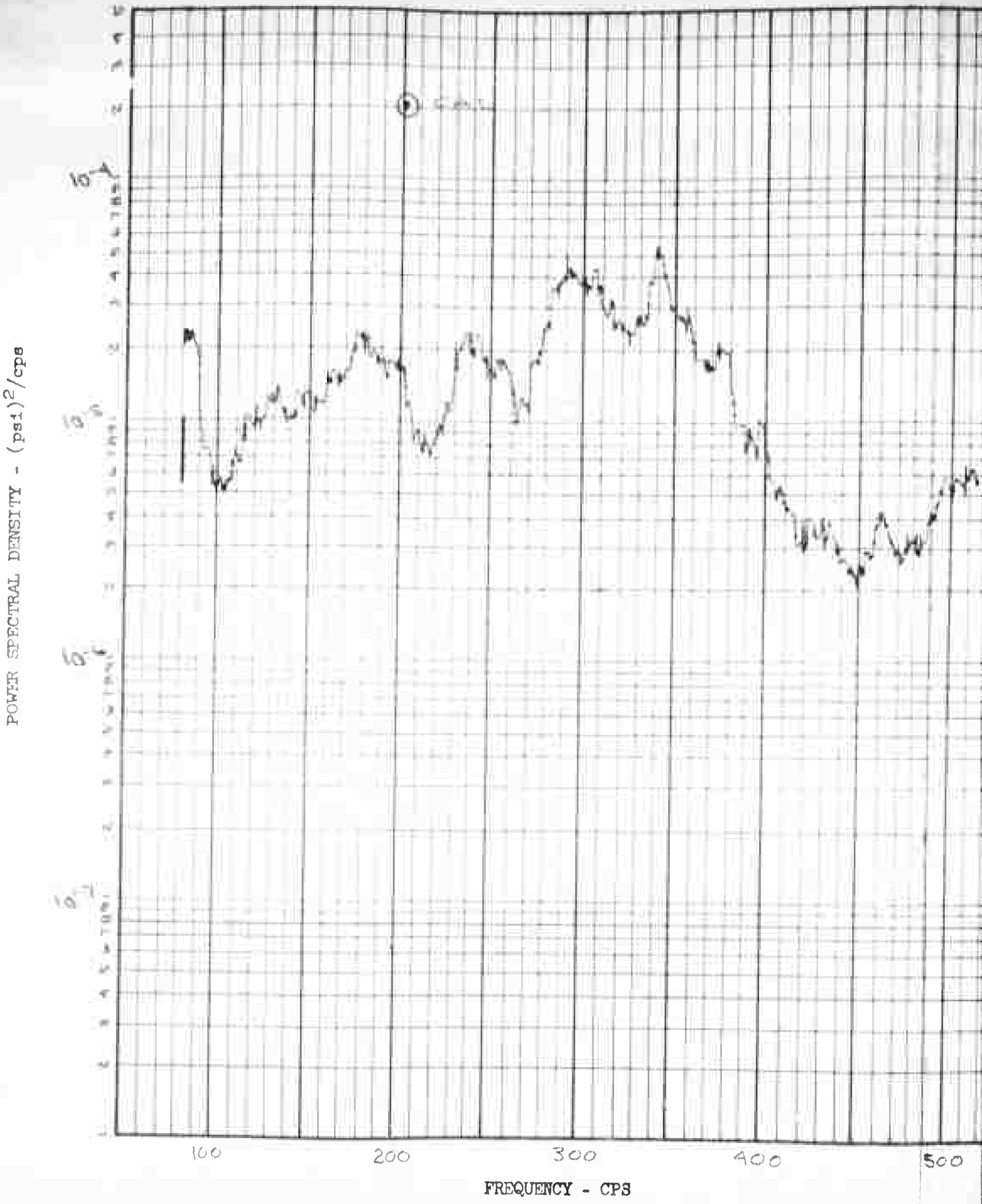
2-5353-7-1



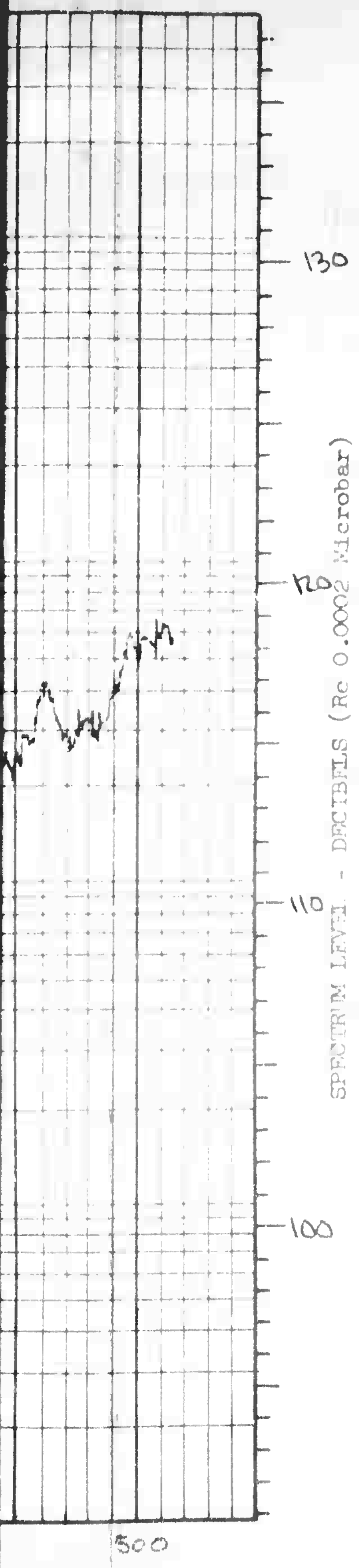
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 80 to 500 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC	[illegible]
CHECK	JBT
APR	
APR	



DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM.	
EWA No. 5-593	Panel or Specimen No. 1493
Tape No. 20 · Tape Channel 2	Mic. No. 1
Elapsed Test Time +5 MIN.	Mic. RMS Level at Sonic Lab. V_L = .415 Volts

CALIBRATION

Tape No. 20	Tape Channel 1	Data Tape RMS Volt V_R = .400

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @200cps

Line Amplifier Settings
For Calibration G_c = .100 ; for Data G_d = .100

Lab. Gain LG = 1.0 | Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

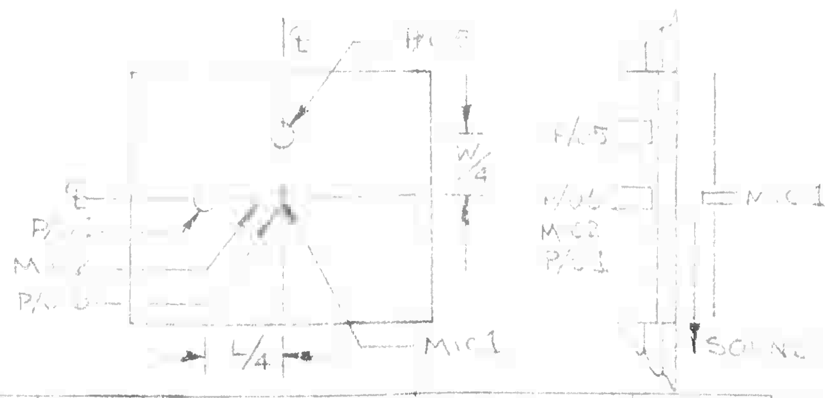
Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(1)(1)}\right]^2 = 2.1 \times 10^{-2} \text{ psi}^2/\text{cps}$$

Analyzer Attenuator Setting -10 db | Log Converter Setting 0 db

Calibration Plotted at 2.1 (10^{-4}) psi²/cps

Overall Pressure Level Data | Equiv. to 152.3 db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.400)}{(1.0)(1.0)(.5)} = .116 \text{ psi}$$



2

CALC	[illegible]	6/22/61	REVISED	DATE
CHECK	JBT	6/22/61		
APR.				
APR.				

POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT
5 MIN TEST
MIC 1 PANEL 1493 PHASE A
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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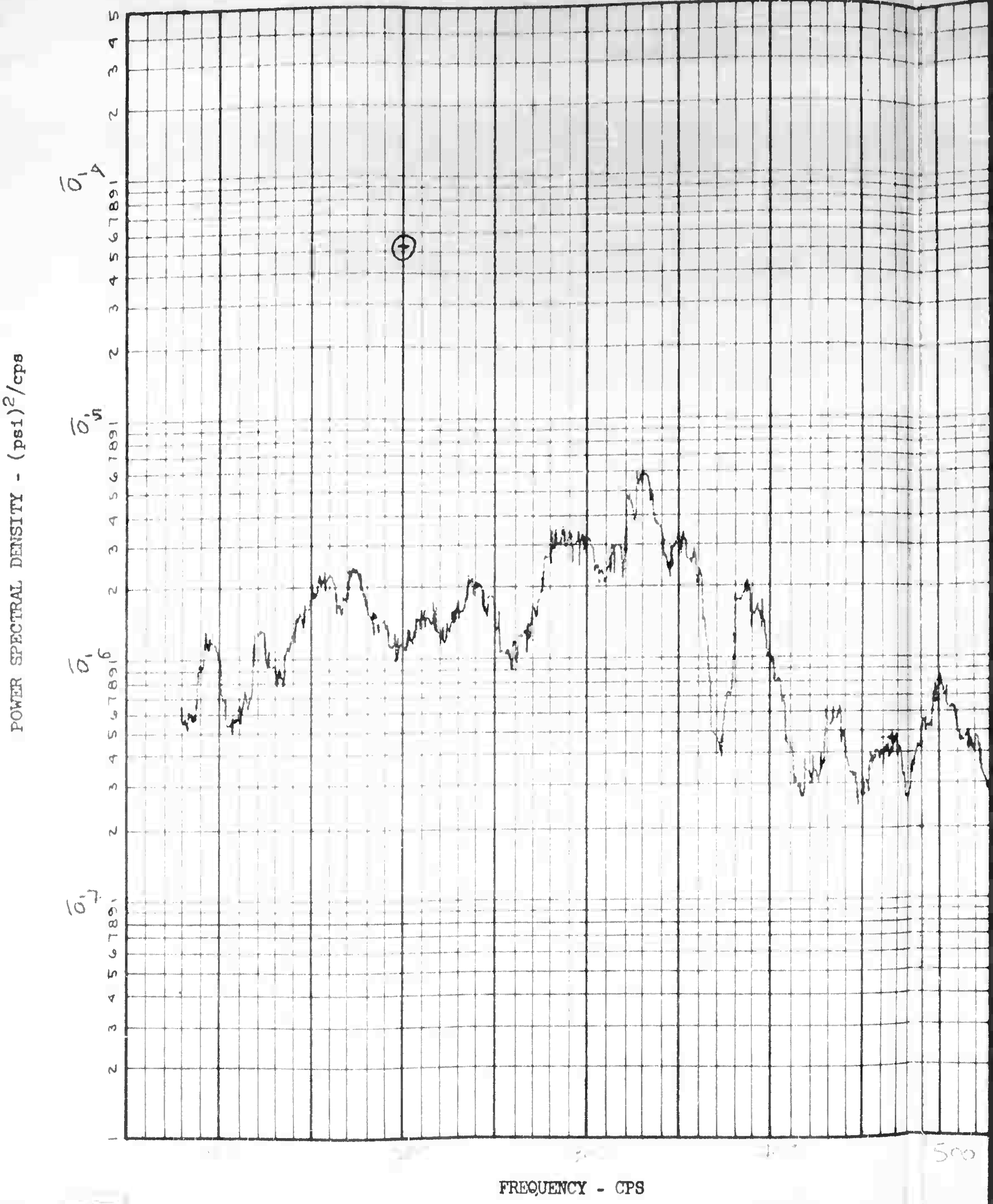
2-5353-7-8



1

ANALYSIS VARIABLES

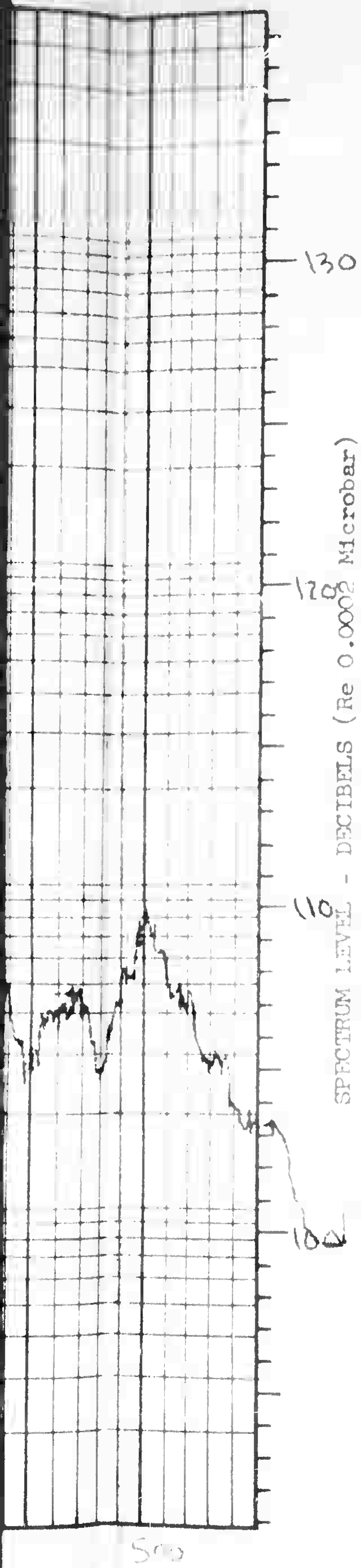
Bandwidth

5 cycles from 80 to 551 cps T_c 4 Sec.

___ cycles from ___ to ___ cps Anal. Rate 1.25 cps/Sec.

___ cycles from ___ to ___ cps Loop Length 4 Sec.

CALC	C.T.
CHECK	JOA
APR.	
APR	



DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM	
EWA No.: 5E93	Panel or Specimen No.: 1493
Tape No.: 20	Tape Channel: 3 / Mic. No.: 2
Elapsed Test Time: +5 MIN	Mic. RMS Level at Sonic Lab. V_L = .115 Volts

CALIBRATION

Tape No. 20	Tape Channel 1	Data Tape RMS Volt V_R = .212

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @ 200cps

Line Amplifier Settings
For Calibration G_c = .100 ; for Data G_d = .200

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

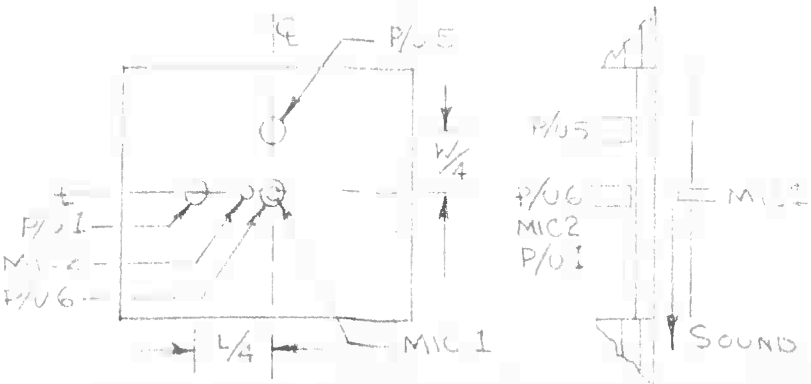
Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{1}\right]^2 \cdot 5.25\ (10^{-3})\ \text{psi}^2/\text{cps}$$

Analyzer Attenuator Setting −25 db	Log Converter Setting 0 db

Calibration Plotted at 5.25 (10^{-3}) psi²/cps

Overall Pressure Level Data — Equiv. to 140.5db SPL

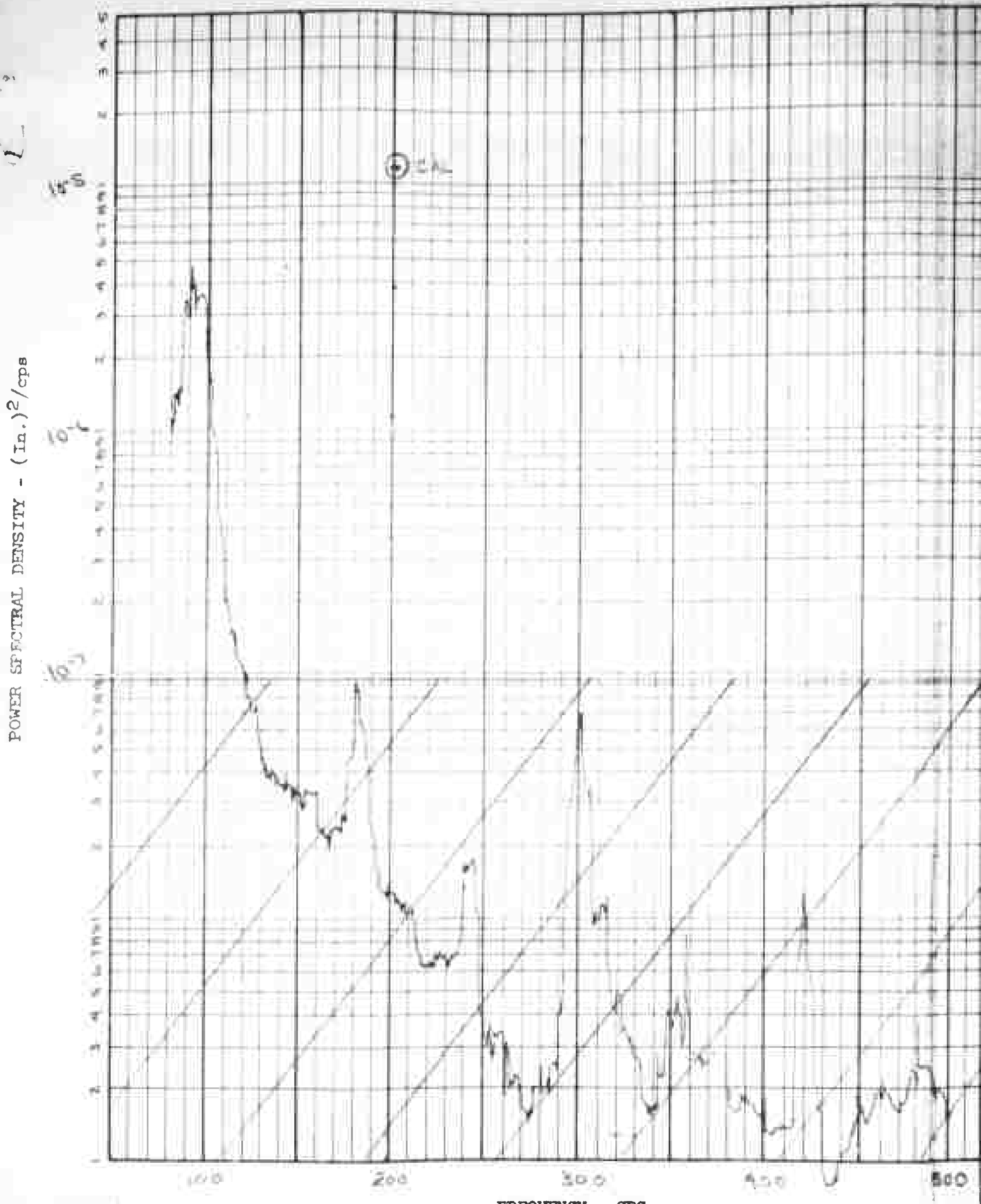
$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.212)}{(2)(1)(.5)} = .0307\ \text{psi}$$



2

CALC	C.T.	6/2/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT — 5 MIN TEST — MIC 2 PANEL 1493 PHASE A — BOEING AIRPLANE COMPANY, SEATTLE 24, WASHINGTON
CHECK	JOA	6/23/61			Vol I
APR.					D2-[illegible]
APR	[illegible]	6/27/61			PAGE FIG. 163

2-5353-7-3

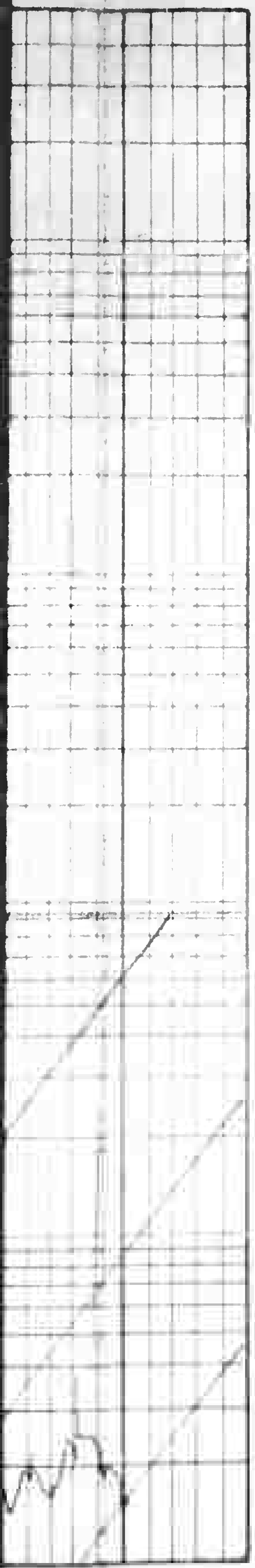


ANALYSIS VARIABLES

Bandwidth

5 cycles from 80 to 550 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC	
CHECK	
APR	
APR	



DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM.	
EWA No. 5-593	Panel or Specimen No. 1493

Tape No.	Tape Channel	Displacement Pickup #
20	4	1

Elapsed Test Time +5 MIN	P/U RMS Level at Sonic Lab. V_L = .140 Volts

CALIBRATION

Tape No.	Tape Channel	Data Tape RMS Volt
20	1	V_R = .142

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .100 ; for Data G_d = .100

Lab. Gain LG = 1.0 | Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .0707 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .03535

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.03535}{(1.0)(1.0)}\right]^2 = 1.225 \times 10^{-3} \text{ in.}^2/\text{cps}$$

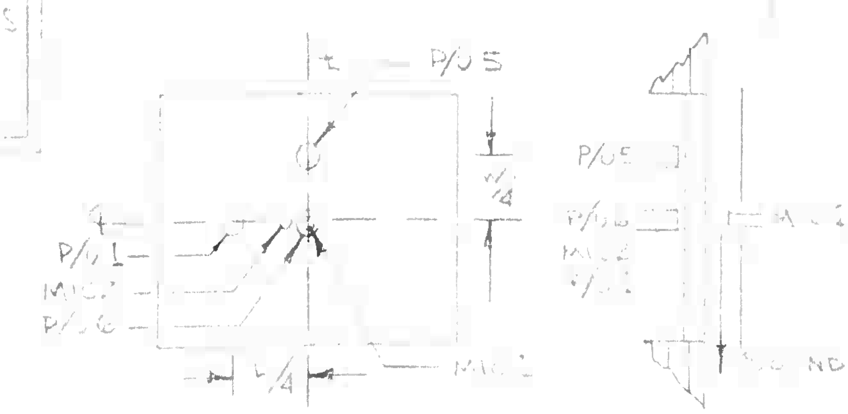
Analyzer Attenuator Setting −20 db | Log Converter Setting 0 db

Calibration Plotted at 1.225×10^{-5} in.^{2}/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0353)(.142)}{(1)(1)(.5)} = .0100 \text{ in.}$$

2

FOR FREQUENCIES ABOVE 150 CPS SEE PAGE 165



CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL. I
CHECK	SOA	4/23/61			P/U 1 PANEL 1493 5 MIN TEST PHASE A	
APR					BOEING AIRPLANE COMPANY	
APR					SEATTLE 24, WASHINGTON	PAGE FIG 164

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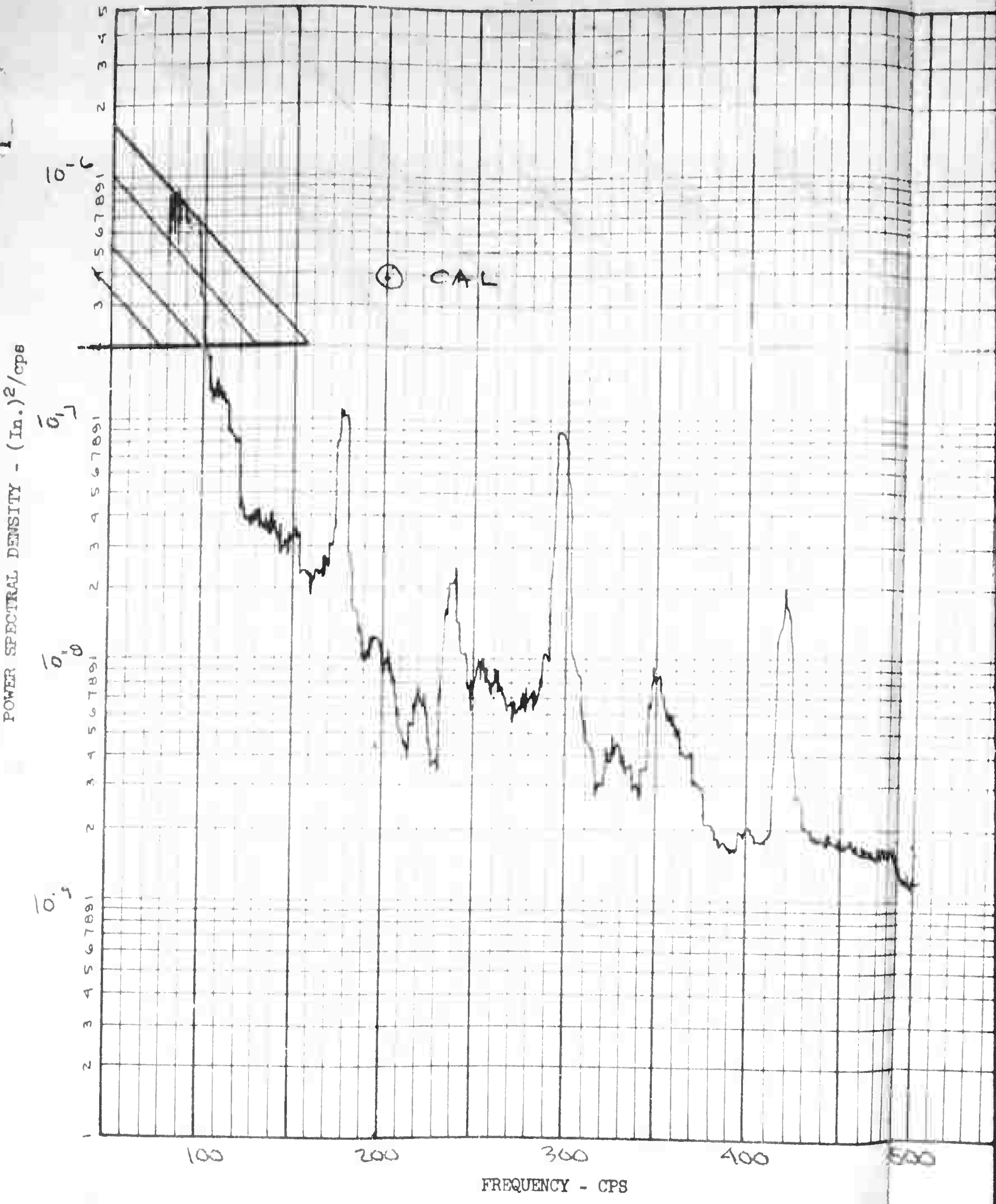


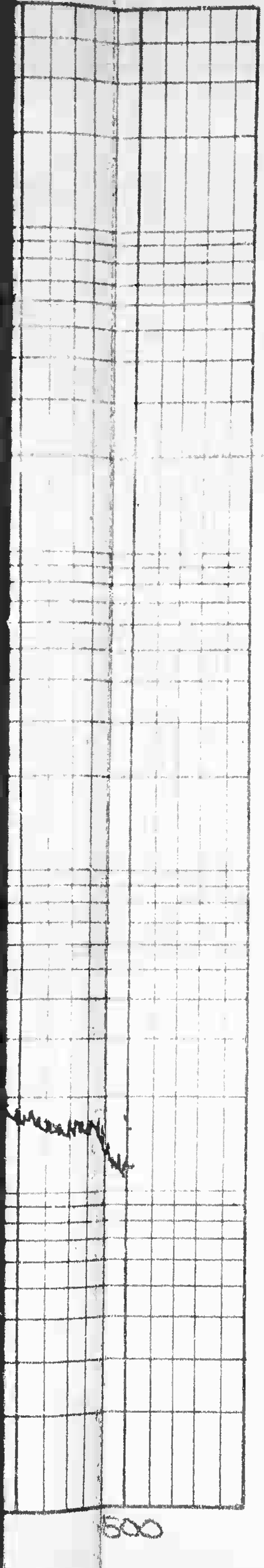
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 80 to 550 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC		6
CHECK	JOA	4
APR		
APR		



DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM.	
EWA No. 5593	Panel or Specimen No. 1493
Tape No. 20	Tape Channel 4
Displacement Pickup # 1	
Elapsed Test Time +5 MIN	P/U RMS Level at Sonic Lab. V_L = .140 Volts

CALIBRATION

Tape No. 20	Tape Channel 1	Data Tape RMS Volt V_R = .142

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @200cps

Line Amplifier Settings
For Calibration G_c = .100 ; for Data G_d = .100

Lab. Gain
LG = 1.0

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .0707 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .03535

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.03535}{(1.0)(1.0)}\right]^2 = 1.225 \times 10^{-3} \text{ in.}^2/\text{cps}$$

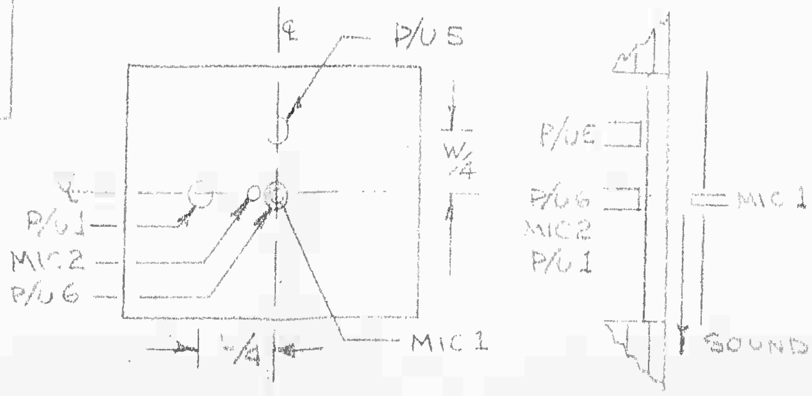
Analyzer Attenuator Setting -35 db

Log Converter Setting 0 db

Calibration Plotted at 3.87 (10^{-7}) in.^{2}/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.03535)(.142)}{(1)(1)(.5)} = .0100 \text{ in.}$$

FOR FREQUENCIES BELOW 150 CPS USE PAGE 164



CALC	HWM	6-22-61	REVISED	DATE
CHECK	JOA	6/23/61		
APR.				
APR.				

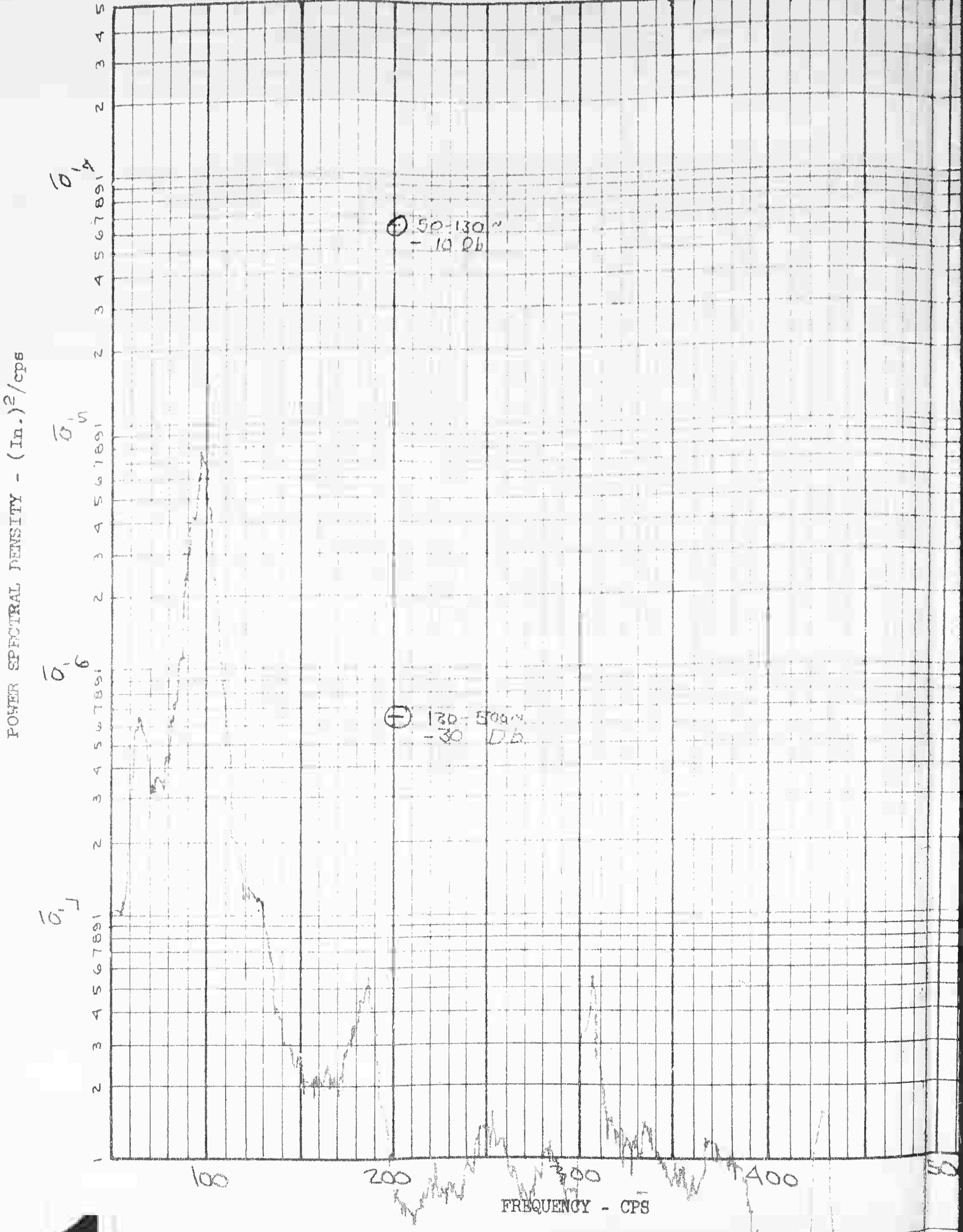
POWER SPECTRAL DENSITY ANALYSIS
OF DISPLACEMENT PICKUP
5 MIN TEST
P/U 1 PANEL 1493 PHASE A

BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

VOL. I
D2-9008A
PAGE
FIG. 165

2-5353-7-9

2



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

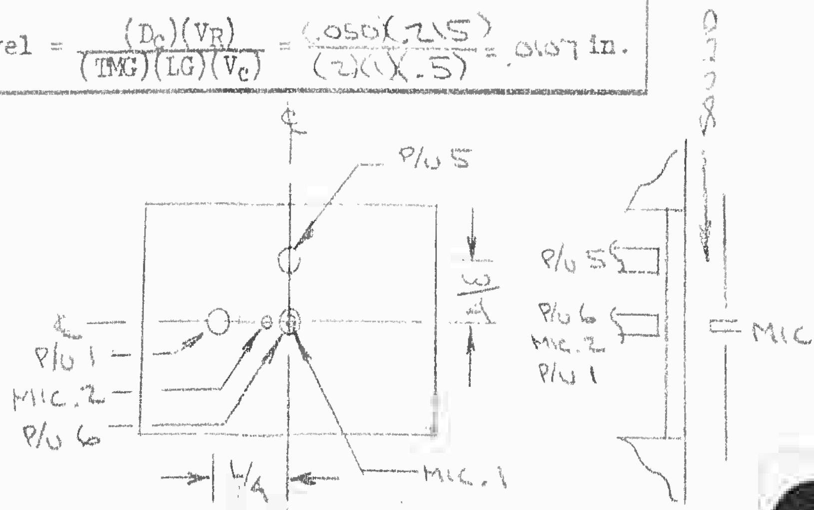
CALC	
CHECK	50
APR.	
APR.	

DATA IDENTIFICATION

Test Title PANEL ATTACH. TYPE I – PRELIM		
EWA No. 5-593	Panel or Specimen No. 1493	
Tape No. 20	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time +5 MIN	P/U RMS Level at Sonic Lab. V_L = .090 Volts	

CALIBRATION

Tape No. 20	Tape Channel 1	Data Tape RMS Volt V_R = .215
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .100 ; for Data G_d = .200		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 2$	
Displacement Pickup Sensitivity S = .100 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S = .050$		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{.050}{(2)(1)}\right)^2 = 6.25 \times 10^{-4}$ in.^{2}/cps		
Analyzer Attenuator Setting 50 - 130 ~ -10 130 - 500 ~ -30	Log Converter Setting db	
Calibration Plotted at 6.25 (10^{-4}) in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.050)(.215)}{(2)(1)(.5)} = .0107$ in.		

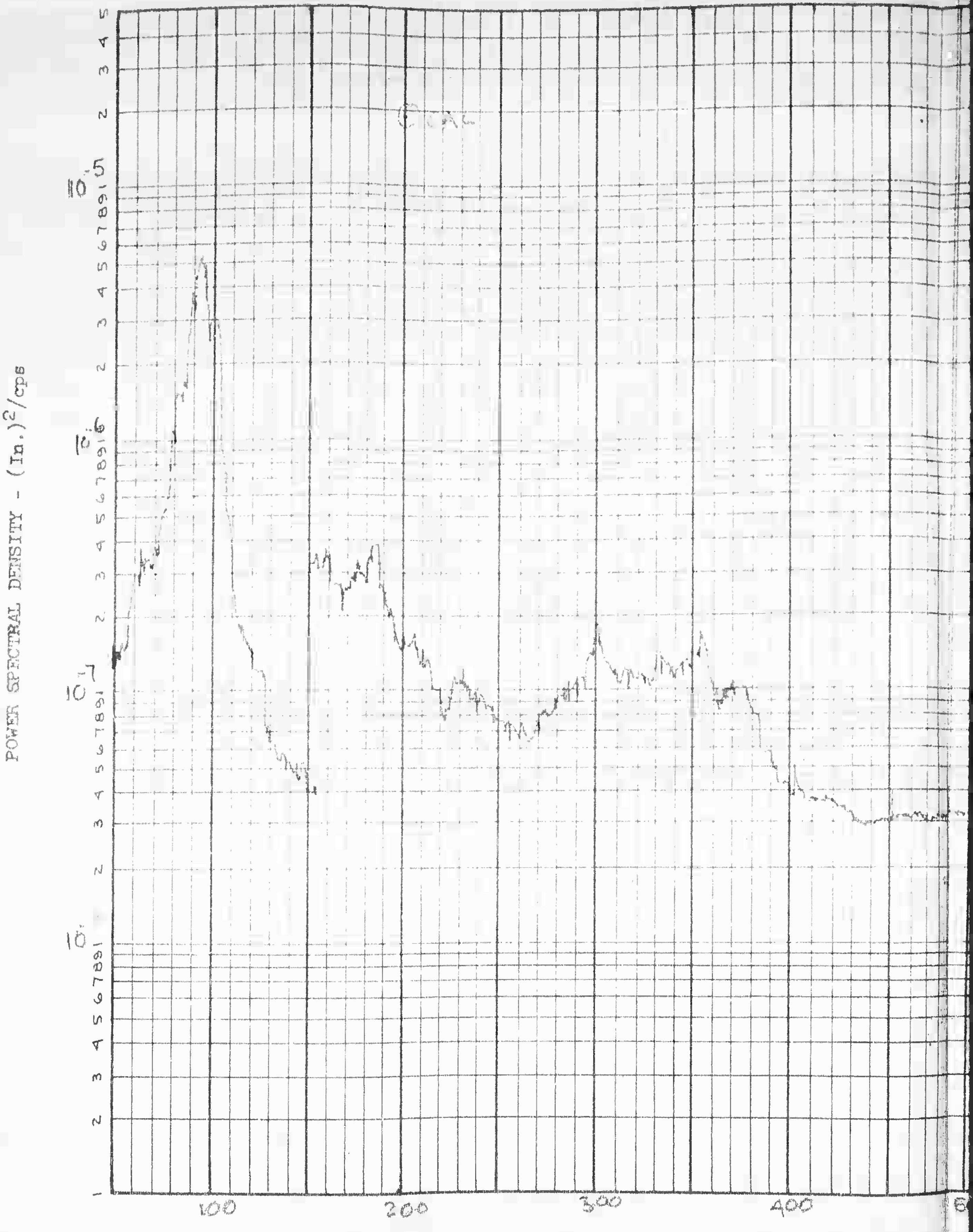


500

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 5 MIN TEST P/U #5 PANEL 1493 PHASE A	VOL I
CHECK	SDA	6/26/61				D2-80084
APR.					BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	PAGE FIG 166
APR.						

2

2-5353-7-9



1

ANALYSIS VARIABLES

Bandwidth

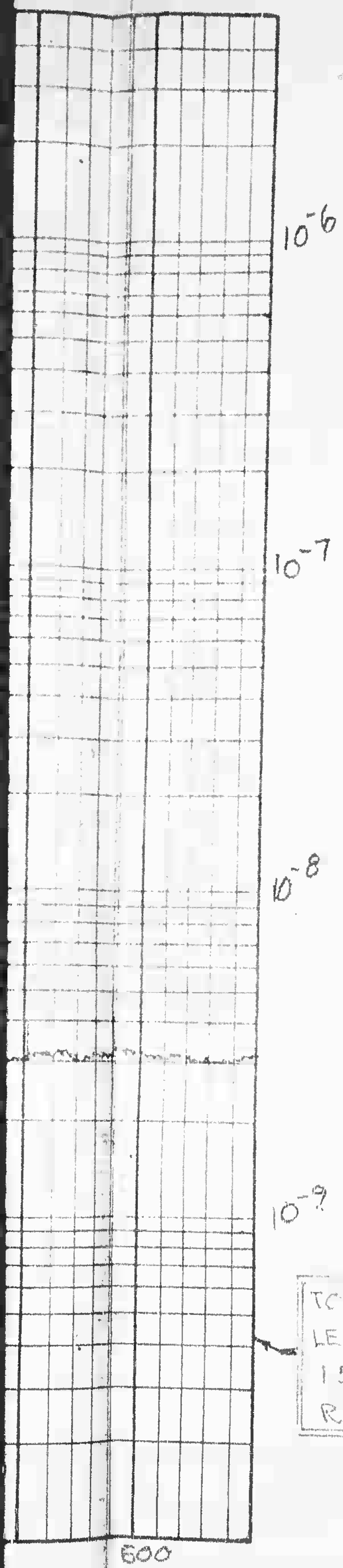
5 cycles from 50 to 550 cps		T_c 4 Sec.
___ cycles from ___ to ___ cps		Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps		Loop Length 4 Sec.

CALC

CHECK

APR.

APR.



TO 150 CPS USE LEFT SCALE,
150 500 CPS USE RIGHT SCALE

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I [illegible]	
EWA No. [illegible]	Panel or Specimen No. 1493
Tape No. [illegible] — Tape Channel 6	Displacement Pickup # 6
Elapsed Test Time 4.5 HR	P/U RMS Level at Sonic Lab. V_L = .120 Volts

CALIBRATION

Tape No. [illegible]	Tape Channel 1	Data Tape RMS Volt V_R = [illegible]

Calibration Voltage
V_a = [illegible] V_{rms} into Line Amp.; V_c = [illegible] V_{rms} on Tape @ 200cps

Line Amplifier Settings
For Calibration G_c = [illegible] ; for Data G_d = [illegible]

Lab. Gain LG = [illegible] — Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = [illegible]

Displacement Pickup Sensitivity
S = .0816 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0438

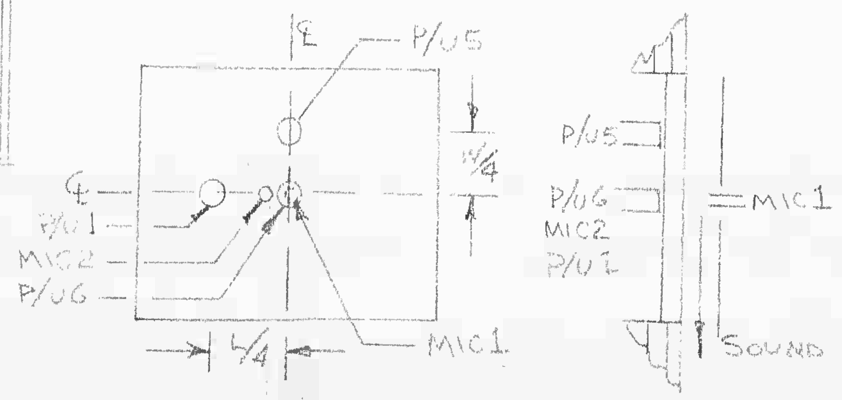
Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{.0438}{(1)(1)}\right)^2 = 1.92 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting −20 / −30 db — Log Converter Setting db

Calibration Plotted at 1.92×10^{-5}, 1.92×10^{-6} in.^{2}/cps

Overall Deflection Level of Data

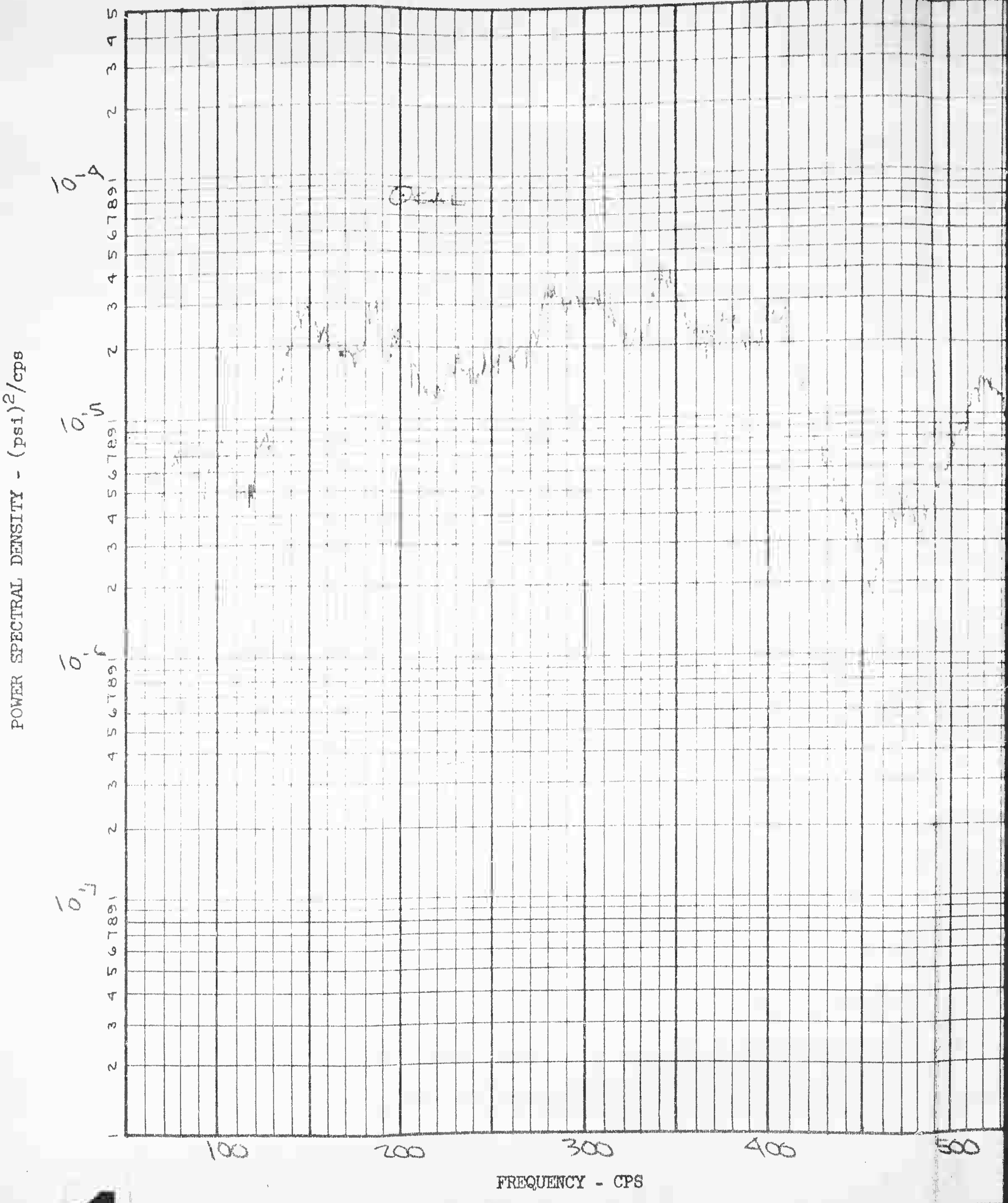
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0438)(.108)}{(1)(1)(.5)} = .0095 \text{ in.}$$



2

CALC	C.T.	6/22/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP P/U #6 PANEL 1493 5 MIN TEST PHASE A BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	Vol I D2-80087 PAGE FIG 167
CHECK	JOA	6/23/61				
APR.						
APR.						
	[illegible]	6/23/61				

2-5353-7-9



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 530 cps T_c 4 Sec.
___ cycles from ___ to ___ cps   Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps   Loop Length 4 Sec.

CALC	C.T.
CHECK	JOA
APR.	
APR	D.C.

DATA IDENTIFICATION

Test Title		
EWA No.	Panel or Specimen No.	
Tape No.	Tape Channel	Mic. No. 1
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = — Volts	

CALIBRATION

Tape No. 23	Tape Channel 7	Data Tape RMS Volt V_R = .192

Calibration Voltage
V_a = V_{rms} into Line Amp.; V_c = V_{rms} on Tape @200cps

Line Amplifier Settings
For Calibration G_c = .200; for Data G_d = .100

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .50

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

Equivalent of Calibration for PSD Plots

$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(.5)(1.0)}\right]^2 = 8.41 \times 10^{-2} \; psi^2/cps$$

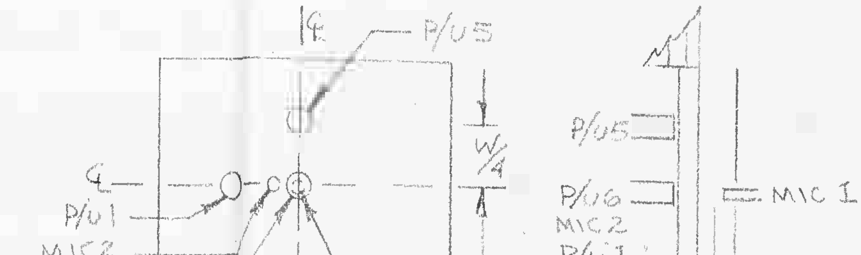
Analyzer Attenuator Setting 30 db	Log Converter Setting db

Calibration Plotted at 8.41 x 10 psi^2/cps

Overall Pressure Level Data	Equiv. to 151.8 db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.192)}{(.5)(1)(.5)} = .112 \; psi$$

2



CALC	C.T.	6/22/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT	VOL I
CHECK	JOA	6/23/61			55 MIN TEST MIC. 1 PANEL 1493 PHASE B	D2 30064
APR.					BOEING AIRPLANE COMPANY	PAGE
APR	D.C.	6/22/61			SEATTLE 24, WASHINGTON	FIG 168

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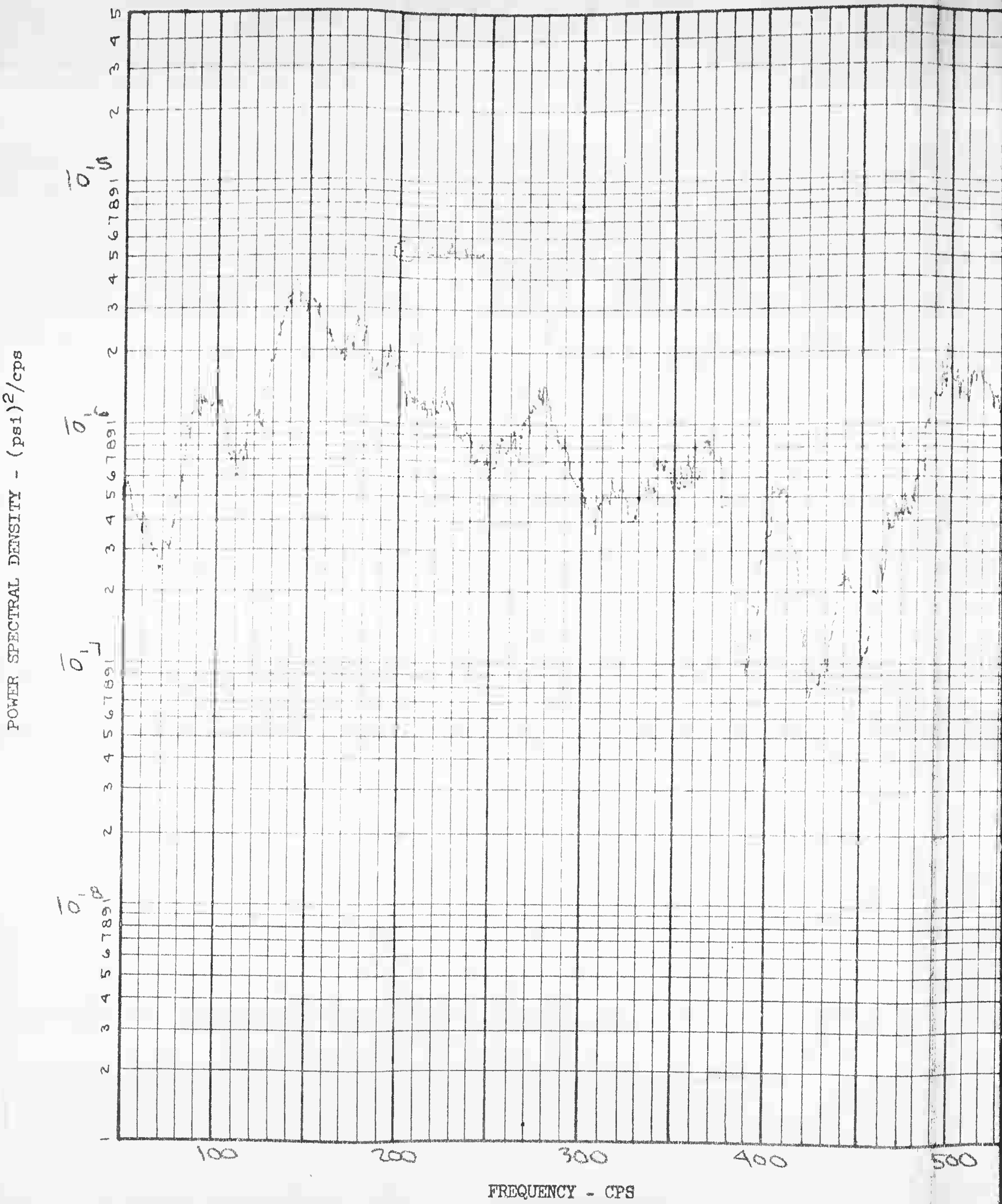


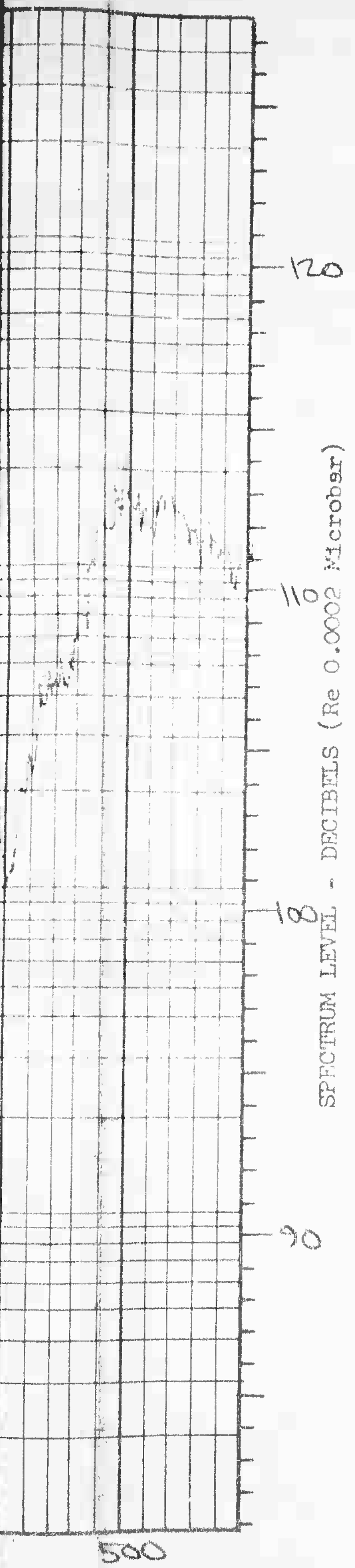
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps — T_c 4 Sec.
___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps — Loop Length 4 Sec.

CALC	C.T.
CHECK	JOA
APR.	
APR.	



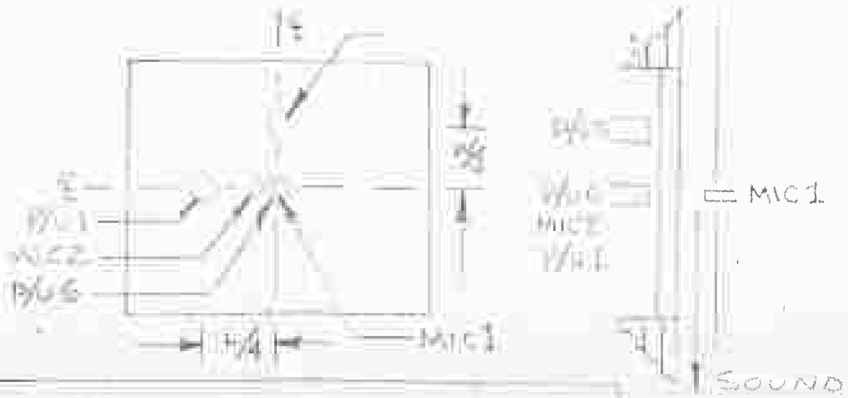
DATA IDENTIFICATION

Test Title		
EWA No.	Panel or Specimen No. 14[illegible]	
Tape No.	Tape Channel	Mic. No. 2
Elapsed Test Time	Mic. RMS Level at Sonic Lab. V_L = — Volts	

CALIBRATION

Tape No.	Tape Channel	Data Tape RMS Volt V_R = .204
Calibration Voltage V_a = [illegible] V_{rms} into Line Amp.; V_c = [illegible] V_{rms} on Tape @200cps		
Line Amplifier Settings For Calibration G_c = [illegible] ; for Data G_d = [illegible]		
Lab. Gain LG = [illegible]	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = [illegible]	
Microphone Sensitivity S = [illegible] psi/Volt or 1 Volt rms = [illegible] db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = [illegible]		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2$ = [illegible] psi²/cps		
Analyzer Attenuator Setting [illegible] db	Log Converter Setting db	
Calibration Plotted at [illegible] psi²/cps		
Overall Pressure Level Data	Equiv. to 140 db SPL	

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.204)}{(\ldots)(\ldots)} = .0296 \text{ psi}$$



CALC	C.T.	6/22/61	REVISED	DATE
CHECK	SOA	6/23/61		
APR.				
APR	[illegible]	6/23/61		

POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT

MIC. #2 PANEL 1493 PHASE B 55 MIN TEST

BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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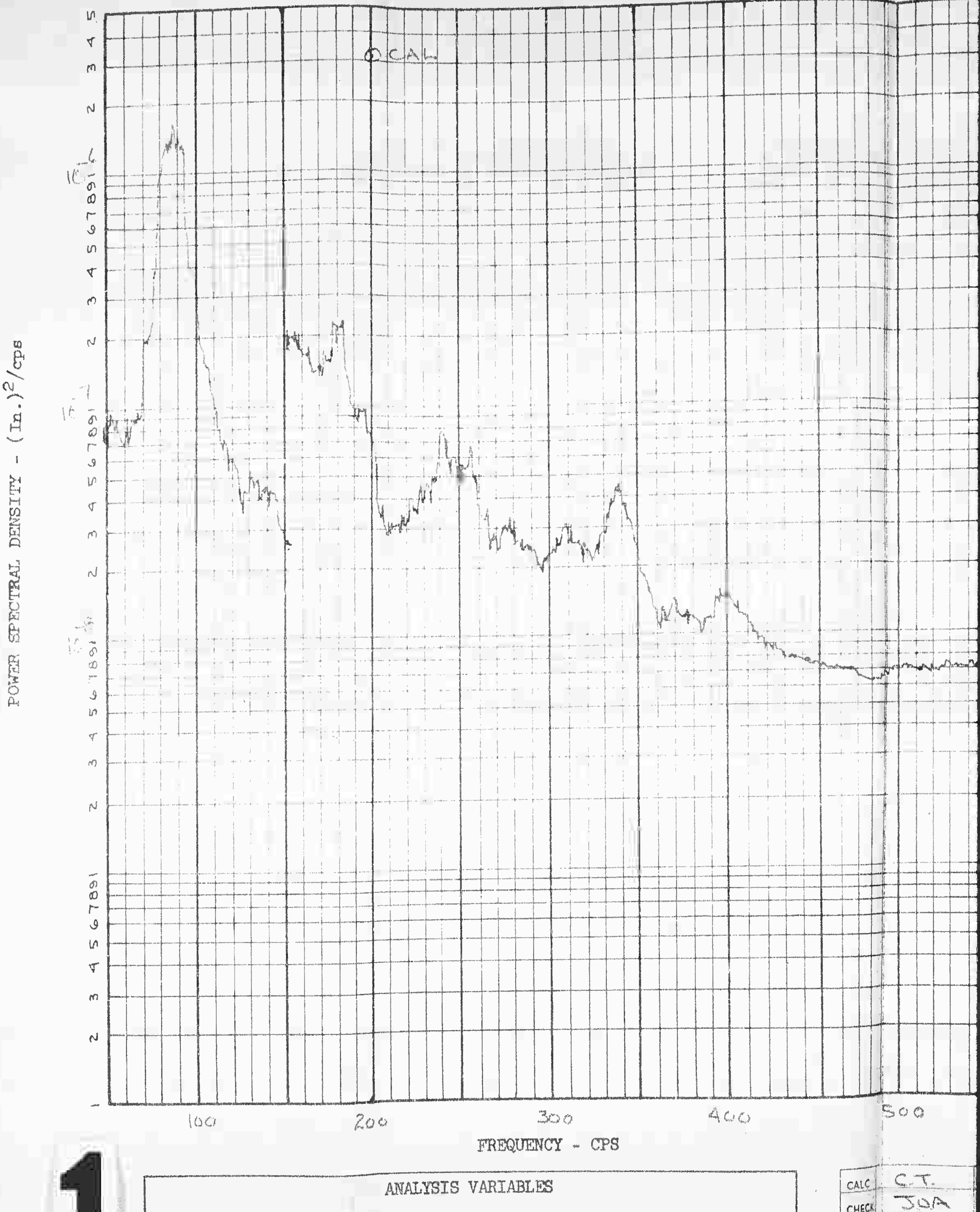
2



1

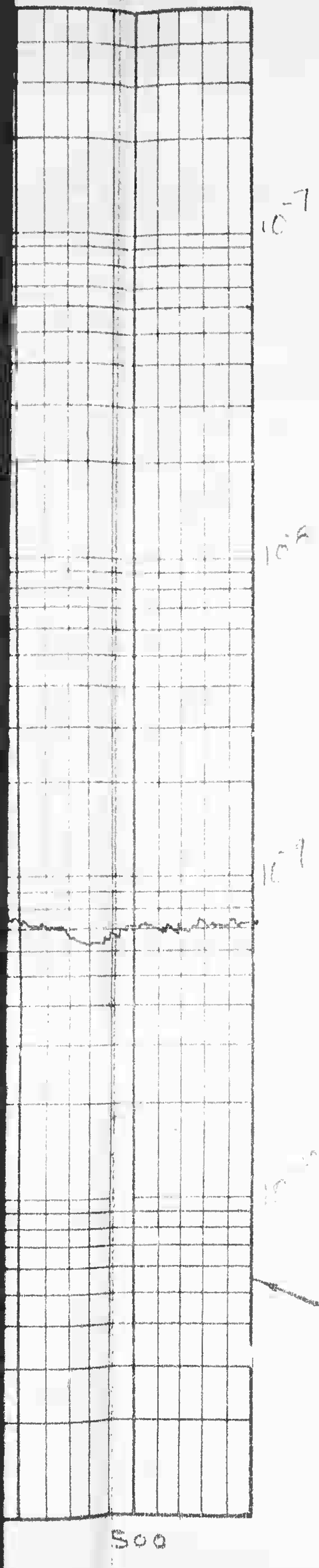
ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 4 Sec.
Anal. Rate 1.25 cps/sec.
Loop Length 4 Sec.

CALC	C.T.
CHECK	JOA
APR.	
APR	



DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM.	
EWA No. 5-593	Panel or Specimen No. 1493

Tape No. 23	Tape Channel 3	Displacement Pickup # 1
Elapsed Test Time +58	P/U RMS Level at Sonic Lab. V_L = .160 Volts	

CALIBRATION

Tape No. 23	Tape Channel 7	Data Tape RMS Volt V_R = .158

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @200cps

Line Amplifier Settings
For Calibration G_c = .200; for Data G_d = .200

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

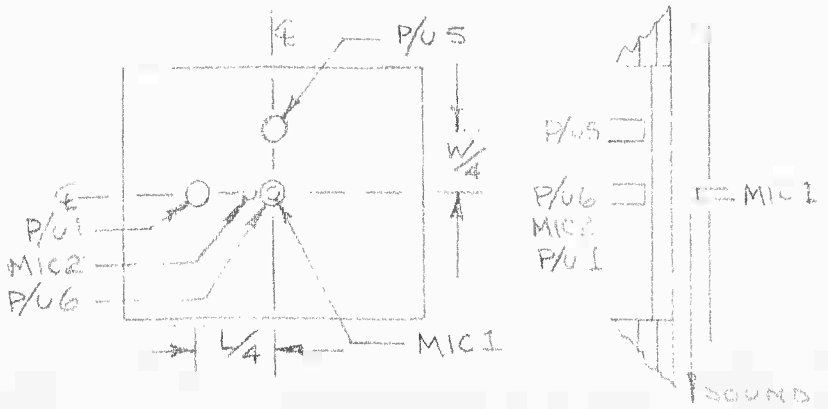
Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(1)(1)}\right]^2 = 3.13 \times 10^{-4} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting [illegible] db — Log Converter Setting db

Calibration Plotted at [illegible] in.^{2}/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.158)}{(1)(1)(.5)} = .0056 \text{ in.}$$

TO 150 CPS USE LEFT SCALE
150-550 CPS USE RIGHT SCALE



CALC	C.T.	6/22/61	REVISED	DATE
CHECK	JDA	6/23/61		
APR.				
APR.				

POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
55 MIN TEST
P/U 1 PANEL 1493 PHASE B
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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PAGE FIG 179

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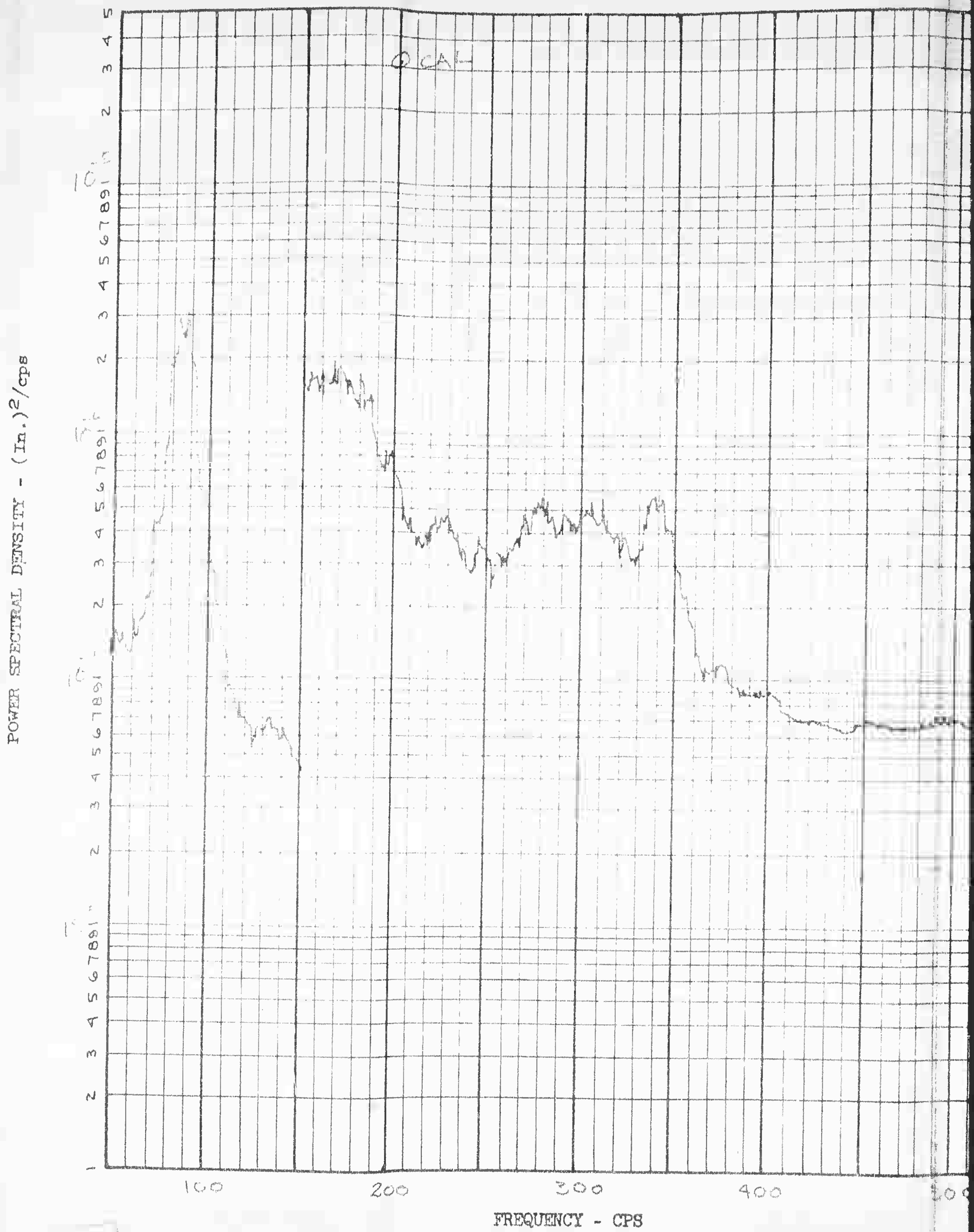
2



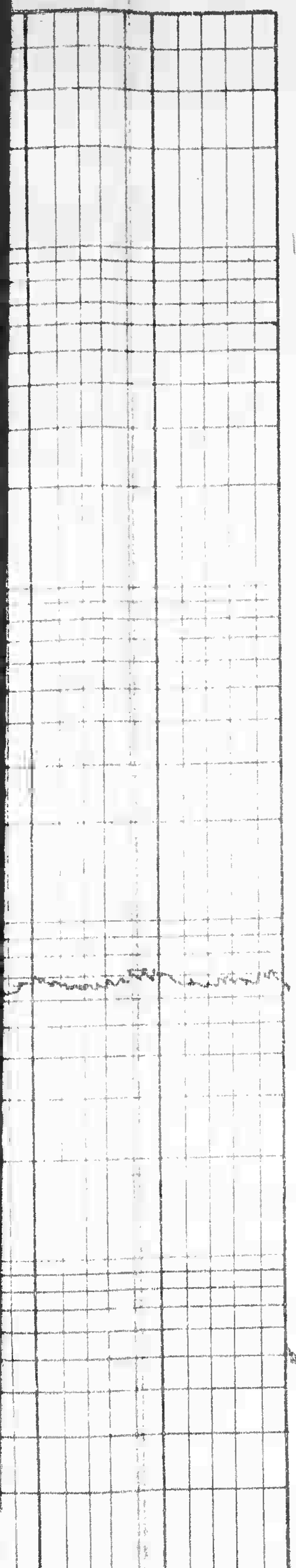
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC
CHECK
APR
APR

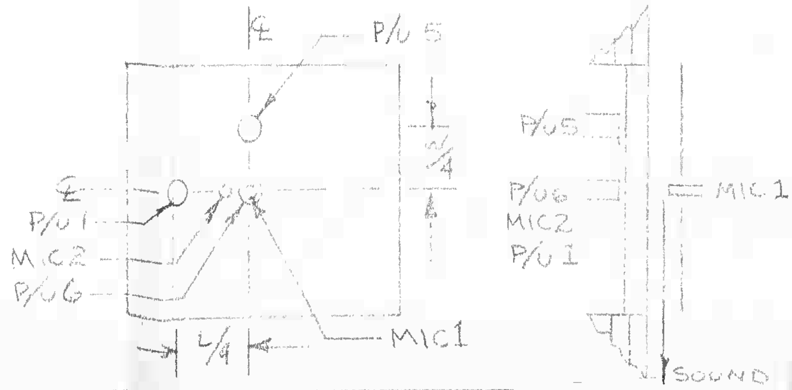


DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM.	
EWA No. 5-573	Panel or Specimen No. 1493
Tape No. 23 / Tape Channel 4	Displacement Pickup # 5
Elapsed Test Time +58	P/U RMS Level at Sonic Lab. V_L = .210 Volts

CALIBRATION

Tape No. 23	Tape Channel 7	Data Tape RMS Volt V_R = 200
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @200 cps		
Line Amplifier Settings For Calibration G_c = .200 ; for Data G_d = .200		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0	
Displacement Pickup Sensitivity S = .0354 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .0177		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(1)(1)}\right]^2 = 3.13(10^{-4})$ in.²/cps		
Analyzer Attenuator Setting −10 −30 db	Log Converter Setting db	
Calibration Plotted at 3.13×10^{-5}, 3.13×10^{-7} in.²/cps		
Overall Deflection Level of Data: RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{.0177(.200)}{(1)(1)(.50)}$ = .0071 in.		



CALC	C.B.I.	6/23/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	Vol. I
CHECK	SOA	6/24/61			55 MIN TEST	D2-9000
APR					P/U 5 PANEL 1493 PHASE B	PAGE
APR		6/22/61			BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	Fig 171

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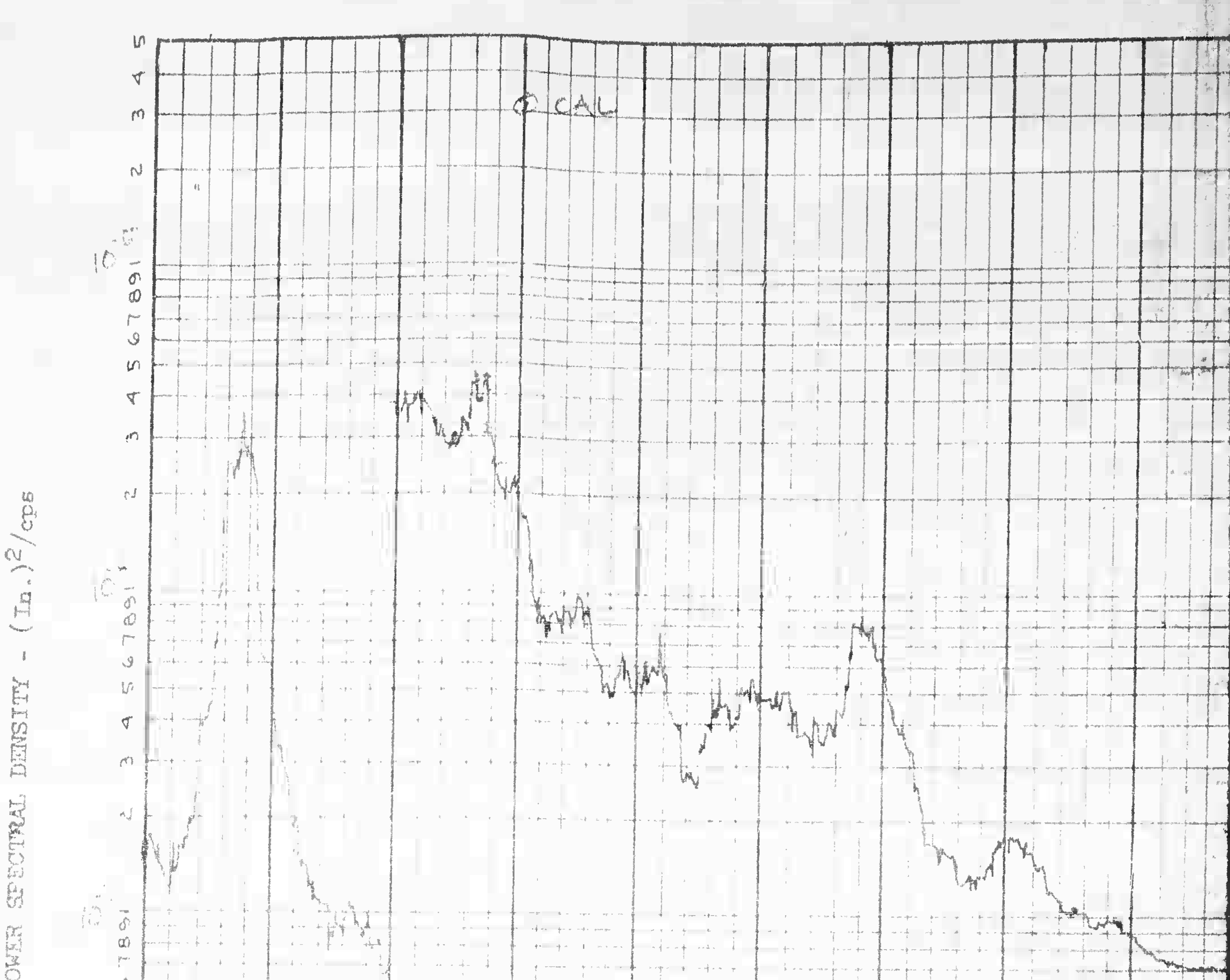
2



1

ANALYSIS VARIABLES

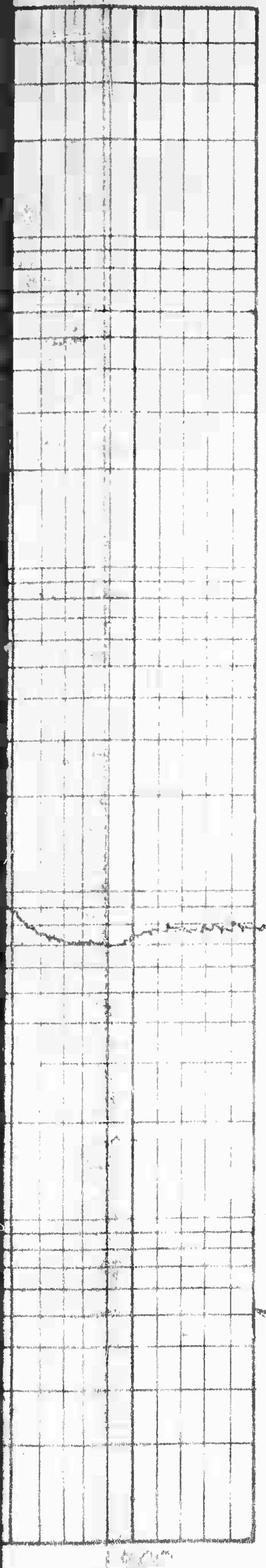
Bandwidth

5 cycles from 50 to 550 cps T_c 4 Sec.

___ cycles from ___ to ___ cps Anal. Rate 125 cps/sec.

___ cycles from ___ to ___ cps Loop Length 4 Sec.

CALC
CHECK
APR
APR



DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I [illegible]	
EWA No. [illegible]	Panel or Specimen No. 1493

Tape No. [illegible]	Tape Channel 5	Displacement Pickup # 6

Elapsed Test Time [illegible]	P/U RMS Level at Sonic Lab. V_L = [illegible] Volts

CALIBRATION

Tape No. [illegible]	Tape Channel 7	Data Tape RMS Volt V_R = .015

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ [illegible] cps

Line Amplifier Settings
For Calibration G_c = [illegible] ; for Data G_d = [illegible]

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = [illegible] in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = [illegible]

Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = [illegible] in.^{2}/cps

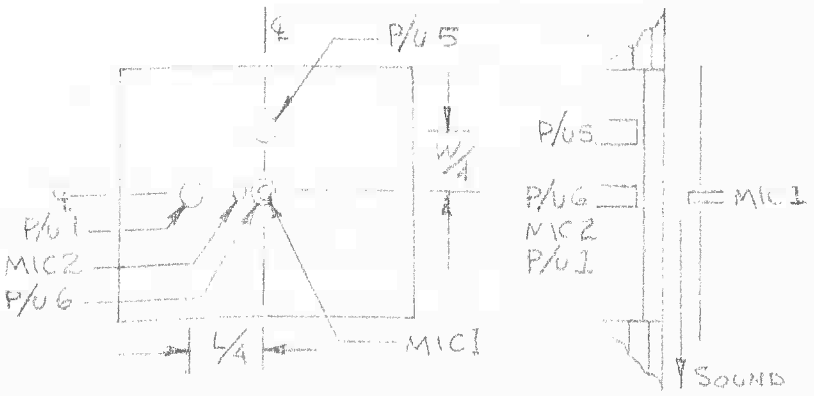
Analyzer Attenuator Setting [illegible] db	Log Converter Setting db

Calibration Plotted at [illegible] in.^{2}/cps

Overall Deflection Level of Data

RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] = .0161 in.

TO 150 CPS USE LEFT SCALE
150-550 CPS USE RIGHT SCALE



CALC	[illegible]	6/23/6[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP P/U 6 PANEL 1493 55MIN TEST PHASE B
CHECK	[illegible]	6/26/[illegible]			BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
APR					VOL I D2-8084
APR	[illegible]	6/27/6[illegible]			PAGE FIG 172

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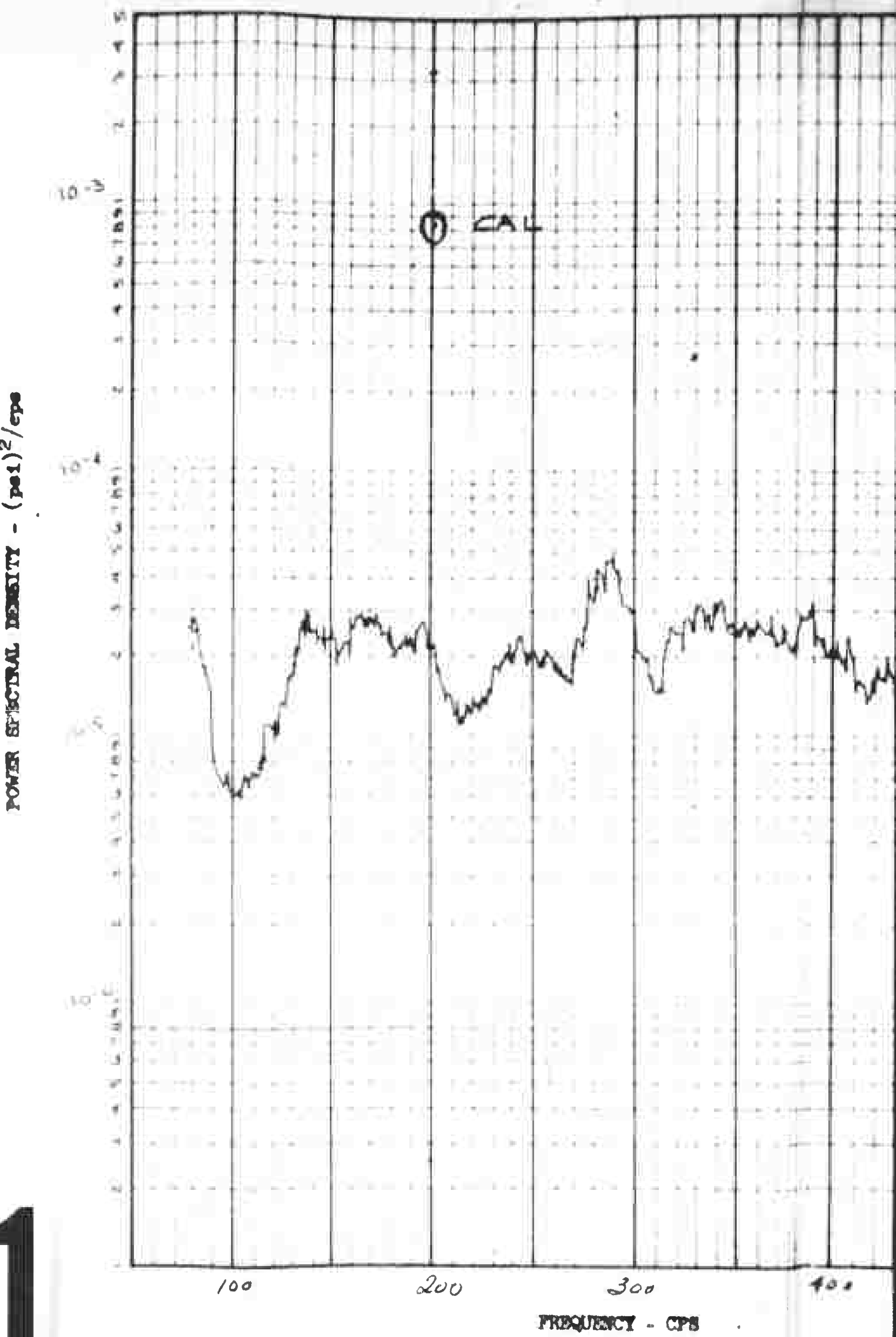
2

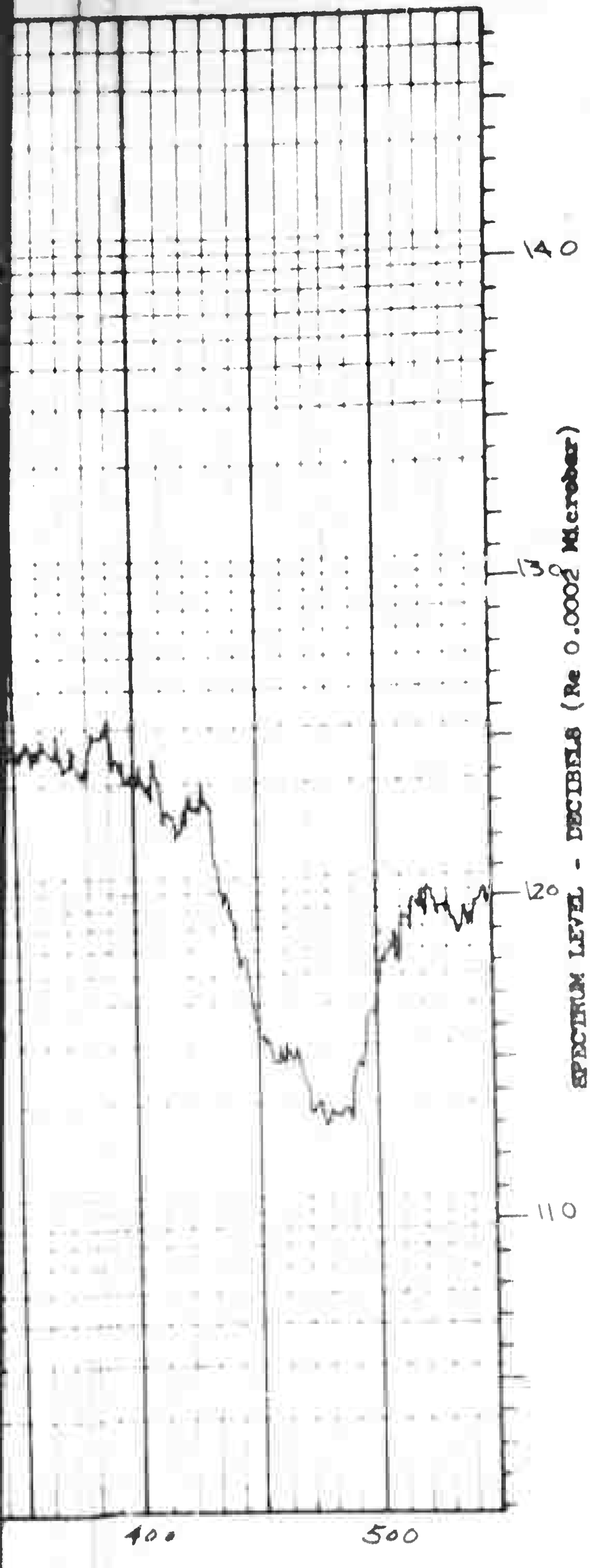


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 80 to 550 cps		T_e 4 Sec.	
___ cycles from ___ to ___ cps		Anal. Rate 625 cps/Sec.	
___ cycles from ___ to ___ cps		Loop Length 4 Sec.	



DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM.		
EWA No. 5-593	Panel or Specimen No. 1494	
Tape No. 21A	Tape Channel 6	Mic. No. 1
Elapsed Test Time 15 MIN.	Mic. RMS Level at Sonic Lab. V_L = .398 Volts	

CALIBRATION

Tape No. 21A	Tape Channel 7	Data Tape RMS Volt V_R = .200

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @200 cps

Line Amplifier Settings
For Calibration G_c = .200; for Data G_d = .100

Lab. Gain LG = 1.0 | Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .5

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

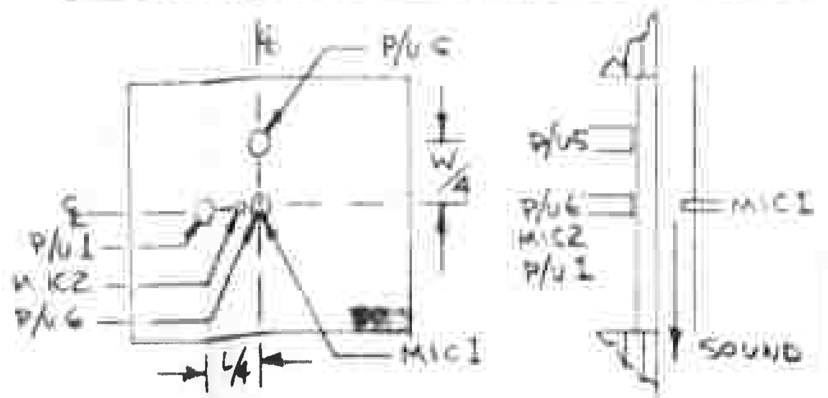
Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{.5(1.0)}\right]^2 = 8.41(10^{-2}) \text{ psi}^2/\text{cps}$$

Analyzer Attenuator Setting	Log Converter Setting
-20 db	0 db

Calibration Plotted at 8.41 (10^-2) psi²/cps

Overall Pressure Level Data | Equiv. to 152.2 db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{.145\,(.200)}{(.5)(1)(.5)} = .116 \text{ psi}$$



2

.625 cps/Sec.
4 Sec.

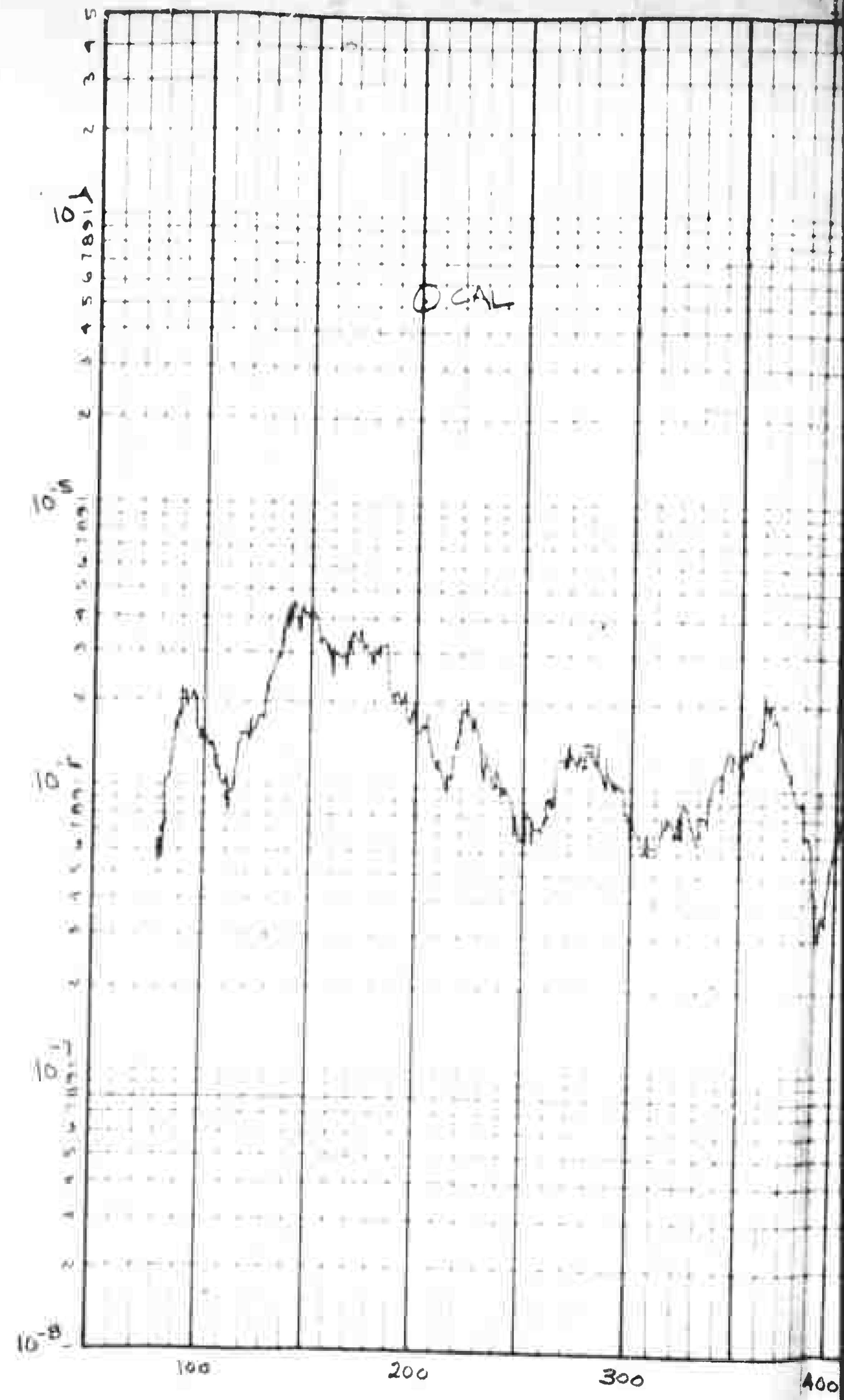
C.T. 6/20/61
RAL 6-20-61

POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT

MIC #1 PANEL 1494 PHASE "A"

BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

VOL I
D2-5C094
PAGE FIG 173

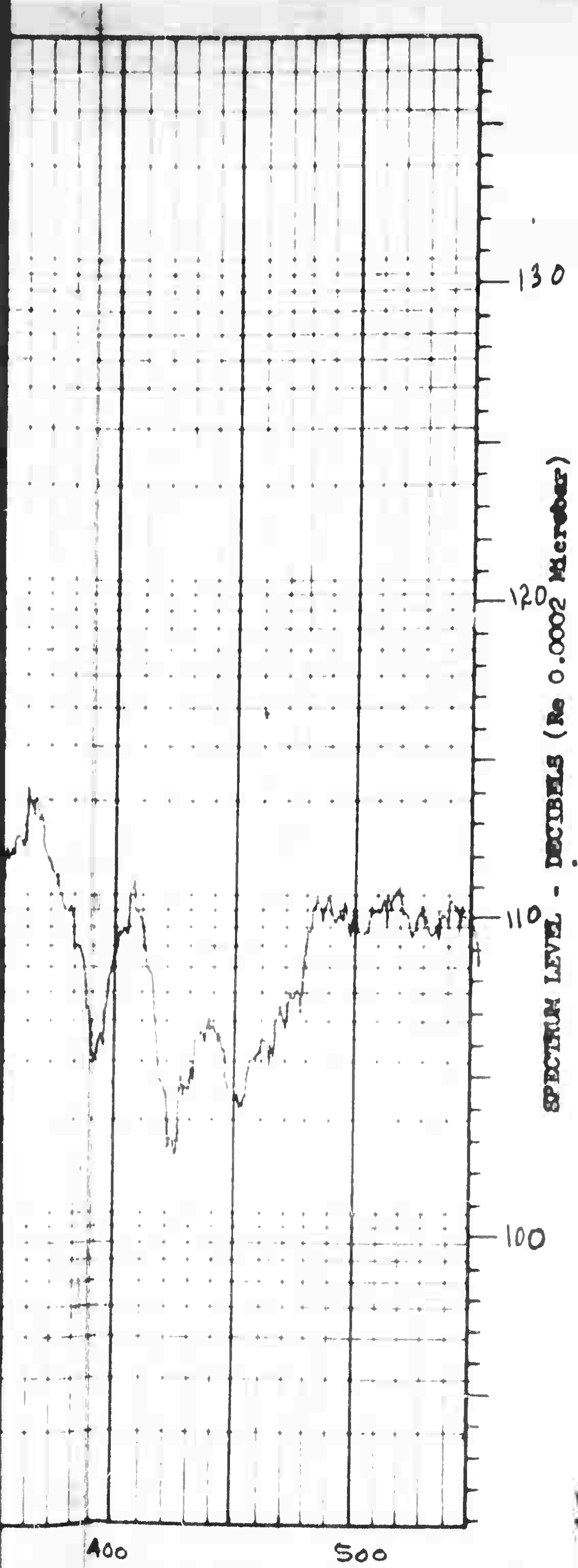


ANALYSIS VARIABLES

Bandwidth

5 cycles from 80 to 550 cps	T_e 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Se	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

1

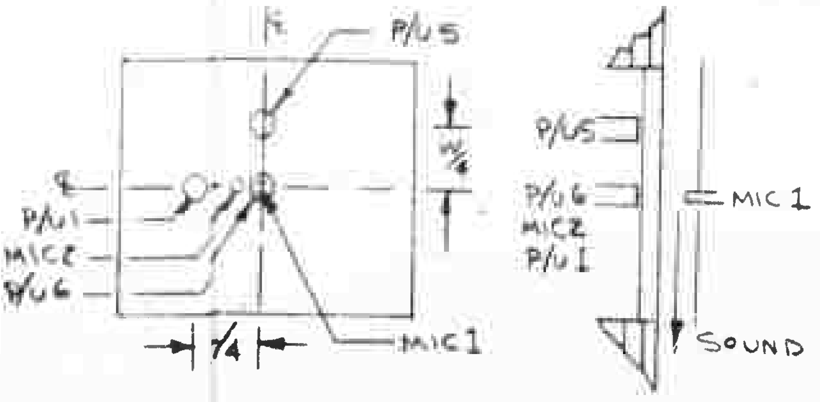


DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM.		
EWA No.: 5-593		Panel or Specimen No.: 1494
Tape No.: 2/A	Tape Channel: 2	Mic. No.: 2
Elapsed Test Time: +5 MIN.		Mic. RMS Level at Sonic Lab. V_L = .112 Volts

CALIBRATION

Tape No.: 2/A	Tape Channel: 7	Data Tape RMS Volt V_R = .225
Calibration Voltage: V_a = .5 V_{rms} into Line Amp.; V_c = 5 V_{rms} on Tape @200cps		
Line Amplifier Settings: For Calibration G_c = .200; for Data G_d = .400		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMC = \frac{G_d}{G_c} = 2.0$	
Microphone Sensitivity: S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi: $P_c = V_a \cdot S = .145$		
Equivalent of Calibration for PSD Plots: $\left(\frac{P_c}{(TMC)(LG)}\right)^2 = \left[\frac{.145}{(2.0)(1.0)}\right]^2 = 5.26(10^{-3})$ psi²/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting 0 db	
Calibration Plotted at 5.26 (10^{-5}) psi²/cps		
Overall Pressure Level Data	Equiv. to 141.1 db SPL	
RMS pressure level $= \frac{(P_c)(V_R)}{(TMC)(LG)(V_c)} = \frac{(.145)(.225)}{(2)(1.0)(.5)} = .0326$ psi		



2

.25 cps/Sec.
4 Sec.

BY	C.T.	6/20/61	REVISED DATE
CHECK	RAL	6-20	
APR			
APR	LK	6/30/61	

POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT

MIC #2 PANEL 1494 PHASE A

BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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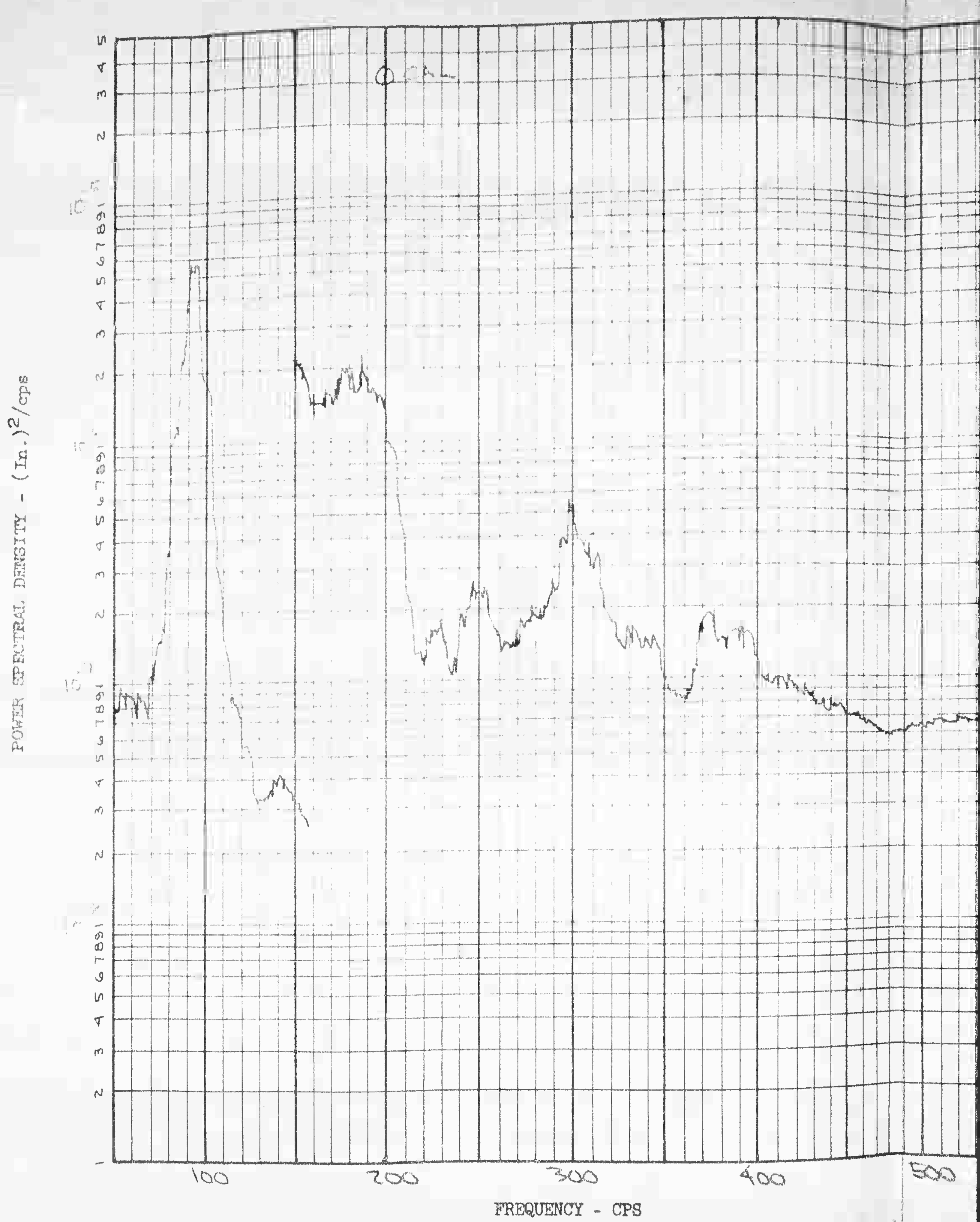
PAGE FIG. 174



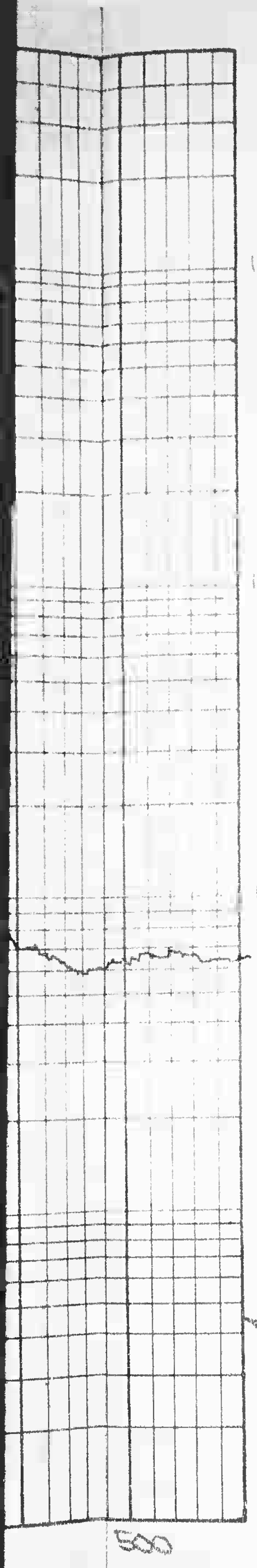
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC	CBT
CHECK	JGA
APR.	
APR.	



DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM.	
EWA No. 5-593	Panel or Specimen No. 1494

Tape No. 21A	Tape Channel 3	Displacement Pickup # 1

Elapsed Test Time +5 MIN	P/U RMS Level at Sonic Lab. V_L = .250 Volts

CALIBRATION

Tape No. 21A	Tape Channel 7	Data Tape RMS Volt V_R = [illegible]

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = [illegible] V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .200 ; for Data G_d = .200

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 1.0$

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S = .0177$

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{.0177}{(1.0)(1.0)}\right)^2 = 3.13 \times 10^{-4} \text{ in.}^2/\text{cps}$$

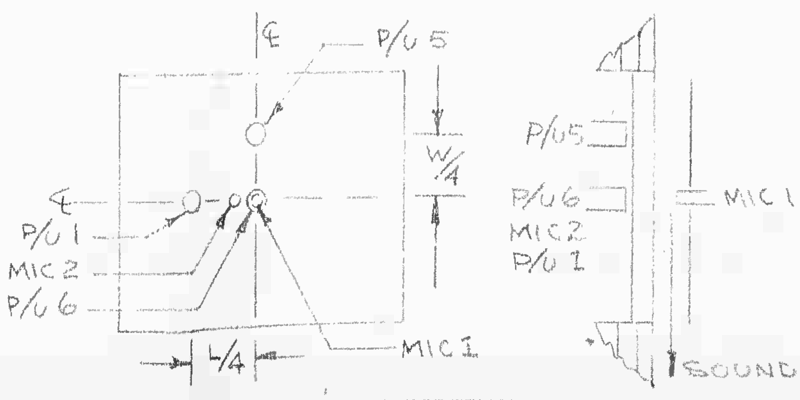
Analyzer Attenuator Setting [illegible] db	Log Converter Setting db

Calibration Plotted at 3.13×10^{-5}
3.13×10^{-7} in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \text{[illegible]} \text{ in.}$$

TO 150 CPS USE
LEFT SCALE
150-550 CPS USE
RIGHT SCALE



CALC	CBT	6/27/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CHECK	JGA	6/26/61			P/U #1 PANEL 1494 5 MIN TEST PHASE A	D2-80084
APR.					BOEING AIRPLANE COMPANY	PAGE FIG 175
APR.	[illegible]	6/28/61			SEATTLE 24, WASHINGTON	

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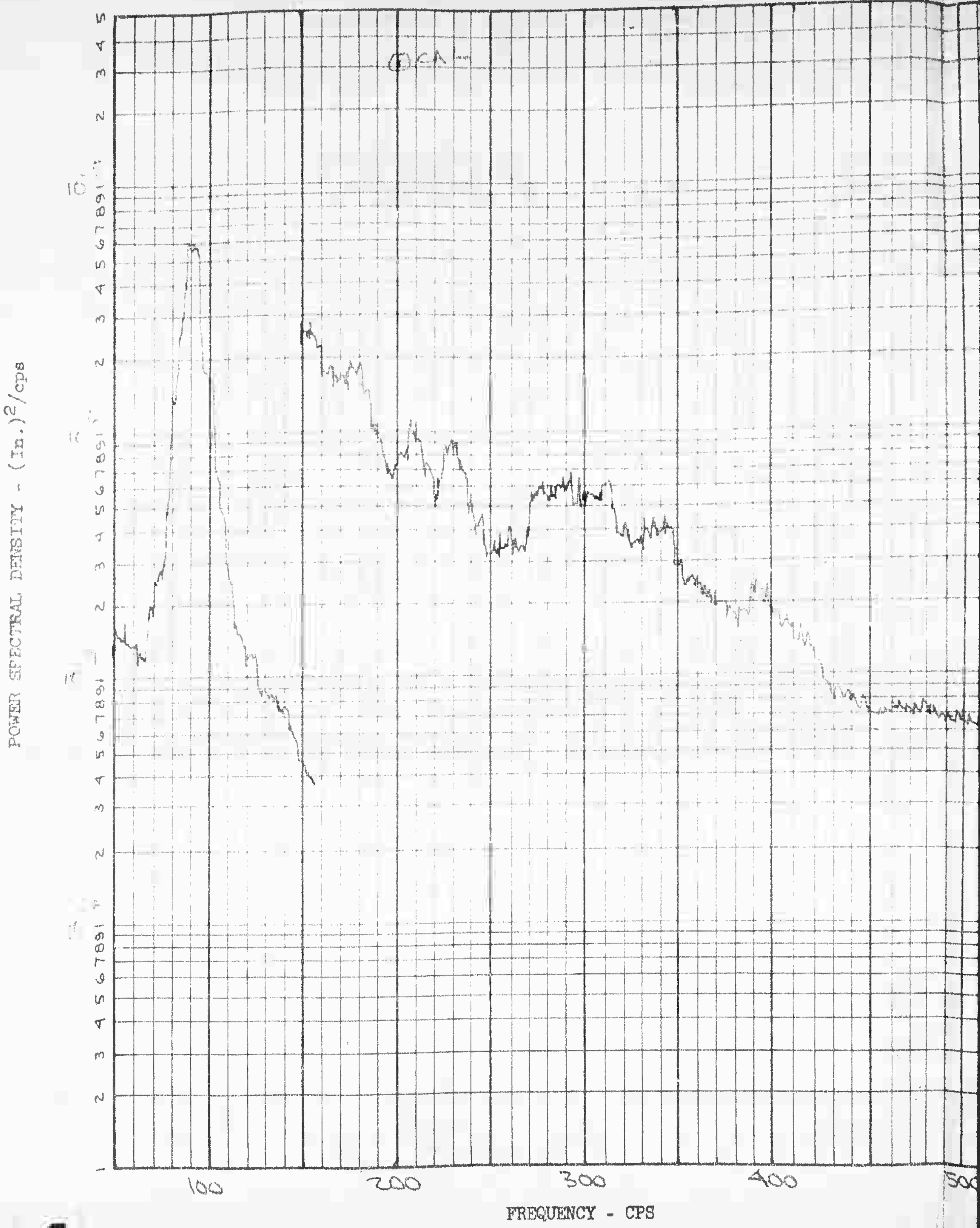
2



1

ANALYSIS VARIABLES

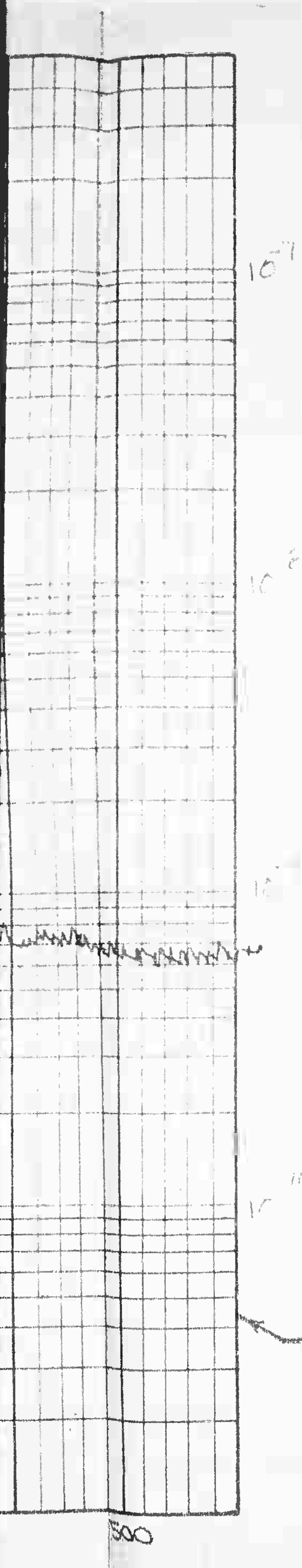
Bandwidth

5 cycles from 50 to 500 cps — T_c 4 Sec.

___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/sec.

___ cycles from ___ to ___ cps — Loop Length 4 Sec.

CALC
CHECK
APR.
APR



DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM		
EWA No. 5-593	Panel or Specimen No. 1494	
Tape No. 21A	Tape Channel 4	Displacement Pickup # 5
Elapsed Test Time +5 MIN	P/U RMS Level at Sonic Lab. $V_L' = 260$ Volts	

CALIBRATION

Tape No. 21A	Tape Channel 7	Data Tape RMS Volt $V_R =$ [illegible]

Calibration Voltage
$V_a = .5\ V_{rms}$ into Line Amp.; $V_c = .5\ V_{rms}$ on Tape @ 200cps

Line Amplifier Settings
For Calibration $G_c = 200$; for Data $G_d = 200$

Lab. Gain
LG = [illegible]

Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 1.0$

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S = .0177$

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{(.0177)}{(1.0)(1.0)}\right)^2 = 3.13 \times 10^{-4}\ \text{in.}^2/\text{cps}$$

Analyzer Attenuator Setting [illegible] db

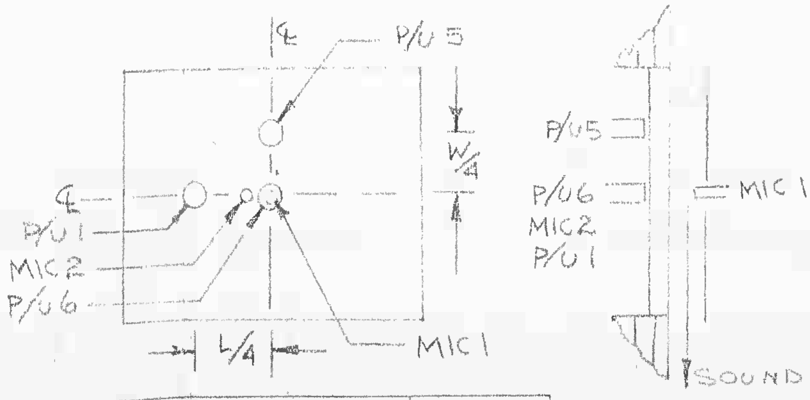
Log Converter Setting 0 db

Calibration Plotted at [illegible] in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \text{[illegible]} = .0094\ \text{in.}$$

To 150 CPS USE LEFT SCALE
150-550 CPS USE RIGHT SCALE



CALC	CBT	6/23/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP P/U #5 PANEL 1494 PHASE A 5 MIN TEST
CHECK	JOA	6/24/61			BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
APR.					Vol I D2-[illegible]
APR	[illegible]	6/30/61			PAGE FIG 176

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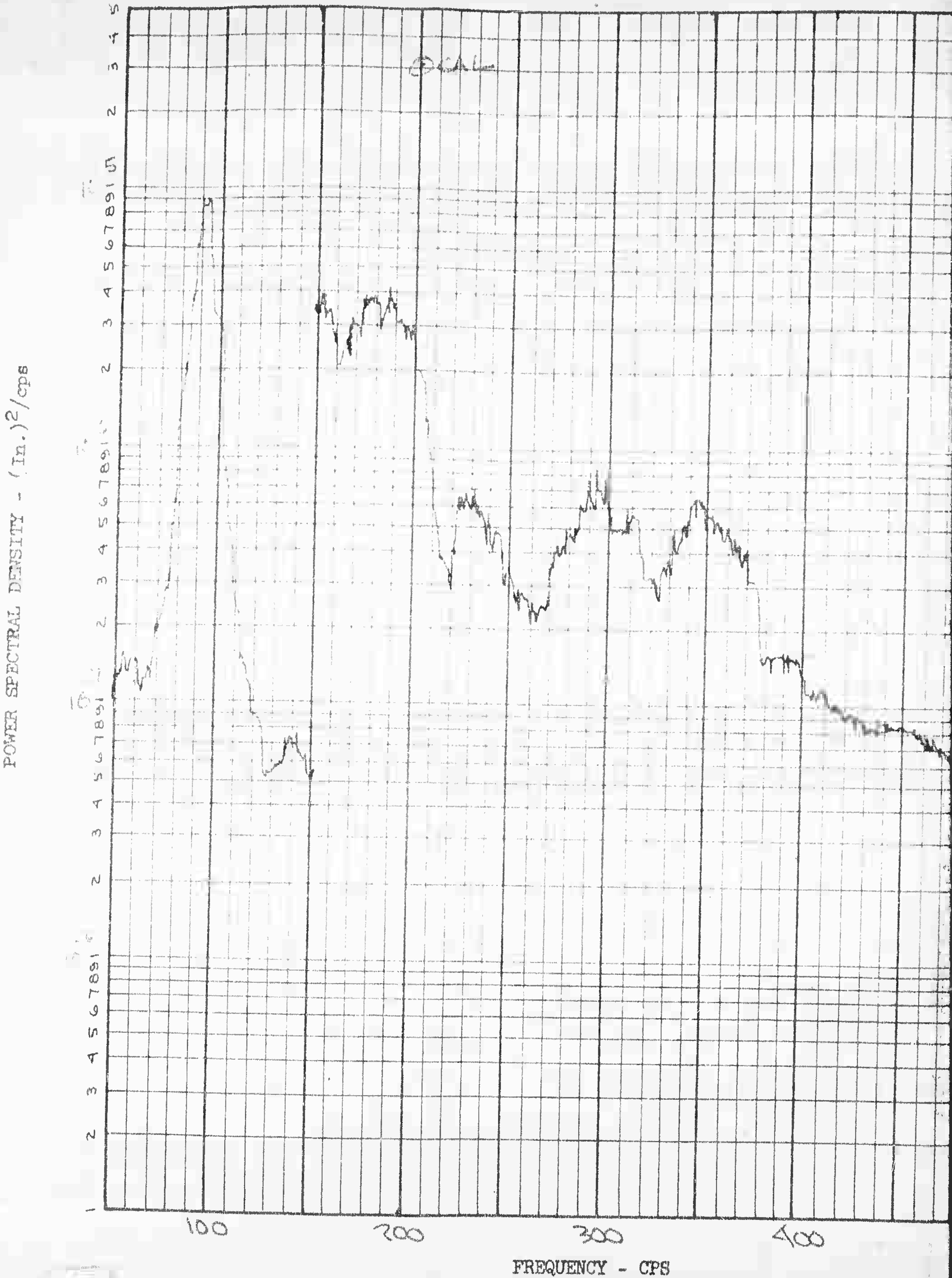
2



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 550 cps — T_c 4 Sec.

___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/sec.

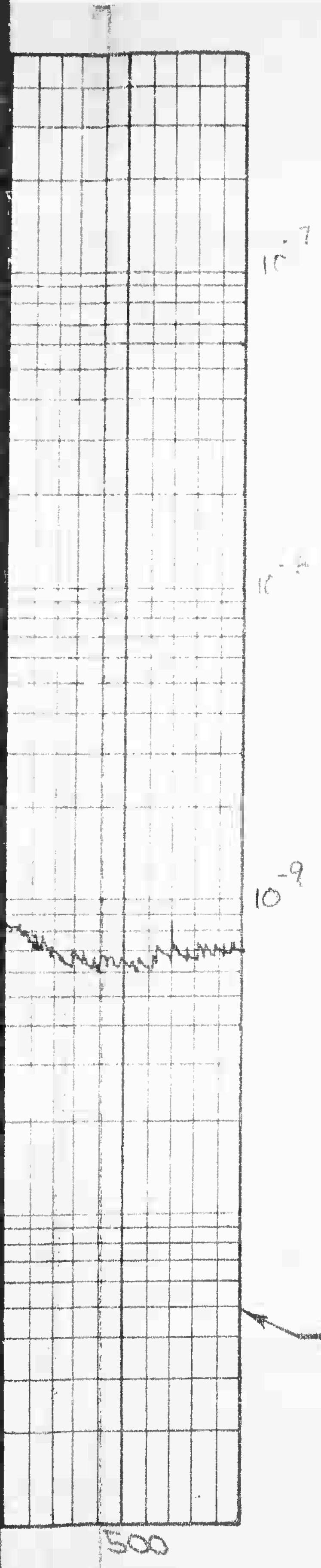
___ cycles from ___ to ___ cps — Loop Length 4 Sec.

CALC

CHEC

APR.

APR.



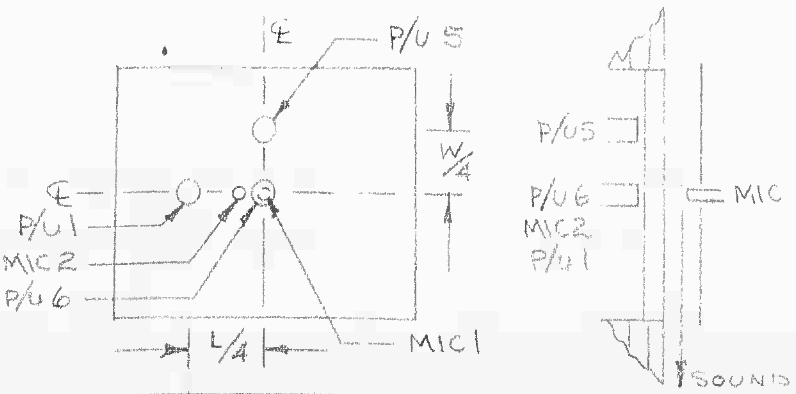
DATA IDENTIFICATION

Test Title		
PANEL ATTACH. TYPE I PRELIM		
EWA No. 5-593	Panel or Specimen No. 1494	
Tape No. 21A	Tape Channel 5	Displacement Pickup # 6
Elapsed Test Time +5 MIN	P/U RMS Level at Sonic Lab. V_L = .290 Volts	

CALIBRATION

Tape No. 21A	Tape Channel 7	Data Tape RMS Volt V_R = [illegible]
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = [illegible] V_{rms} on Tape @200cps		
Line Amplifier Settings For Calibration G_c = 200 ; for Data G_d = 200		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0	
Displacement Pickup Sensitivity S = .0354 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .0177		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{.0177}{(1.0)(1.0)}\right)^2 = 3.13 \times 10^{-4}$ in.^{2}/cps		
Analyzer Attenuator Setting [illegible] db	Log Converter Setting db	
Calibration Plotted at [illegible] in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] = .0115 in.		

TO 150 CPS USE LEFT SCALE
150-550 CPS USE RIGHT SCALE



CALC	CBT	6/22/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 5 MIN TEST P/U # 6 PANEL 1494 PHASE A	Vol. I
CHECK	JOA	6/26/61				D2-80089
APR.					BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	PAGE
APR.	DK	6/27/61				FIG 177

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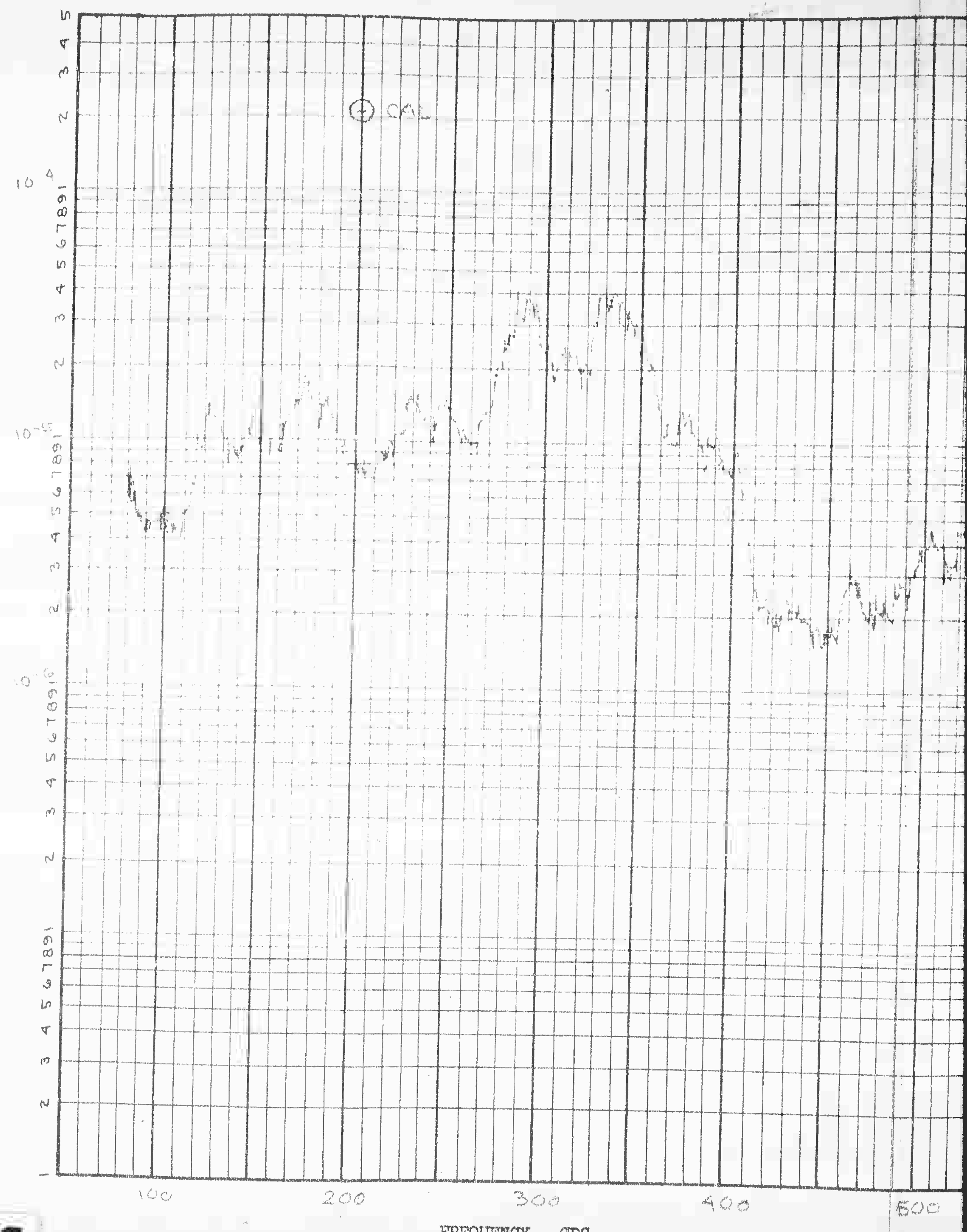
2



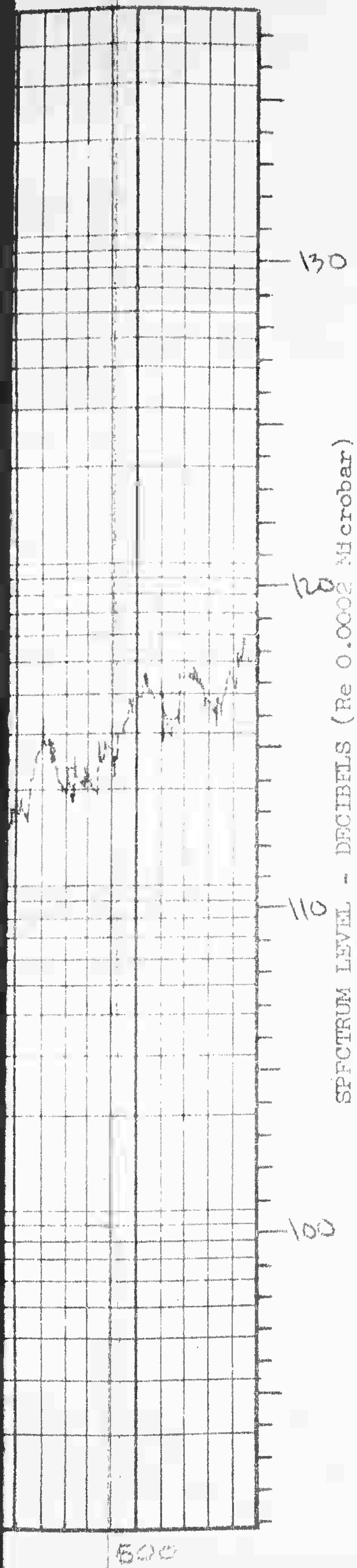
1

ANALYSIS VARIABLES

Bandwidth

6 cycles from 80 to 550 cps T_c 4 Sec.
___ cycles from ___ to ___ cps Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps Loop Length 4 Sec.

CALC	
CHECK	JOA
APR.	
APR.	



DATA IDENTIFICATION

Test Title: PANEL ATTACH. TYPE I PRELIM.	
EWA No.: 5-593	Panel or Specimen No.: 1495
Tape No.: 21	Tape Channel: 2 — Mic. No.: 1
Elapsed Test Time: 45	Mic. RMS Level at Sonic Lab. V_L = .420 Volts

CALIBRATION

Tape No. 21	Tape Channel 1	Data Tape RMS Volt V_R = .355

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .41 V_{rms} on Tape @200 cps

Line Amplifier Settings
For Calibration G_c = .100 ; for Data G_d = .100

Lab. Gain LG = 1.0 — Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

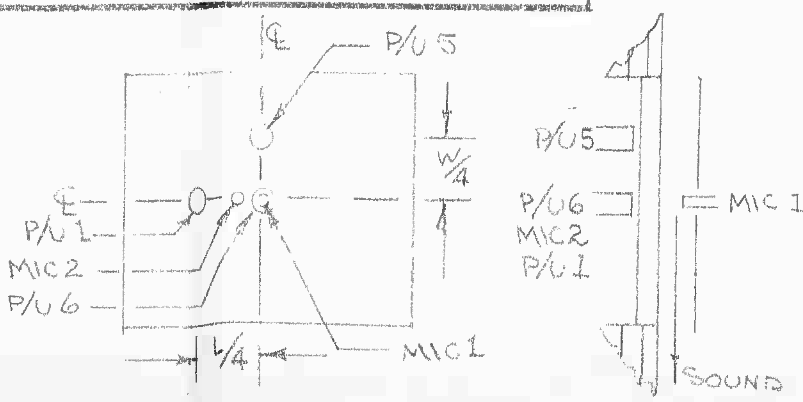
Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(1)(1)}\right]^2 = 2.1\,(10^{-2}) \quad psi^2/cps$$

Analyzer Attenuator Setting −20 db — Log Converter Setting 0 db

Calibration Plotted at 2.1 (10^{-4}) psi^2/cps

Overall Pressure Level Data — Equiv. to 151.6 db SPL
$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{.145\,(.355)}{(1)(1)(.41)} = .1255 \quad psi$$



CALC	MFM	4-28-61	REVISED	DATE
CHECK	JOA	4/24/61		
APR.				
APR.				

POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT
5 MIN TEST
MIC 1 PANEL 1495 PHASE A
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

Vol. I
D2-80084
PAGE FIG 178

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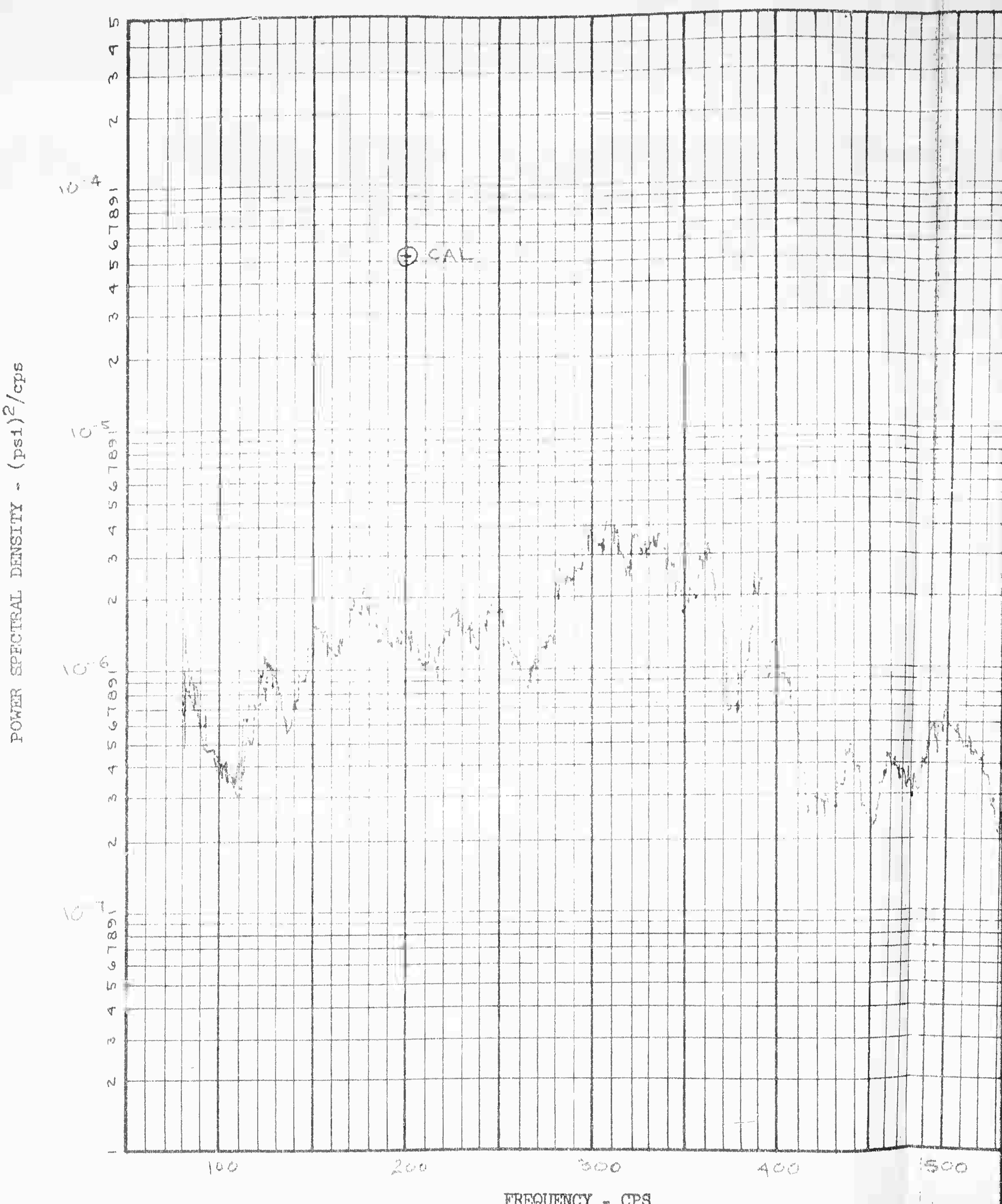
2

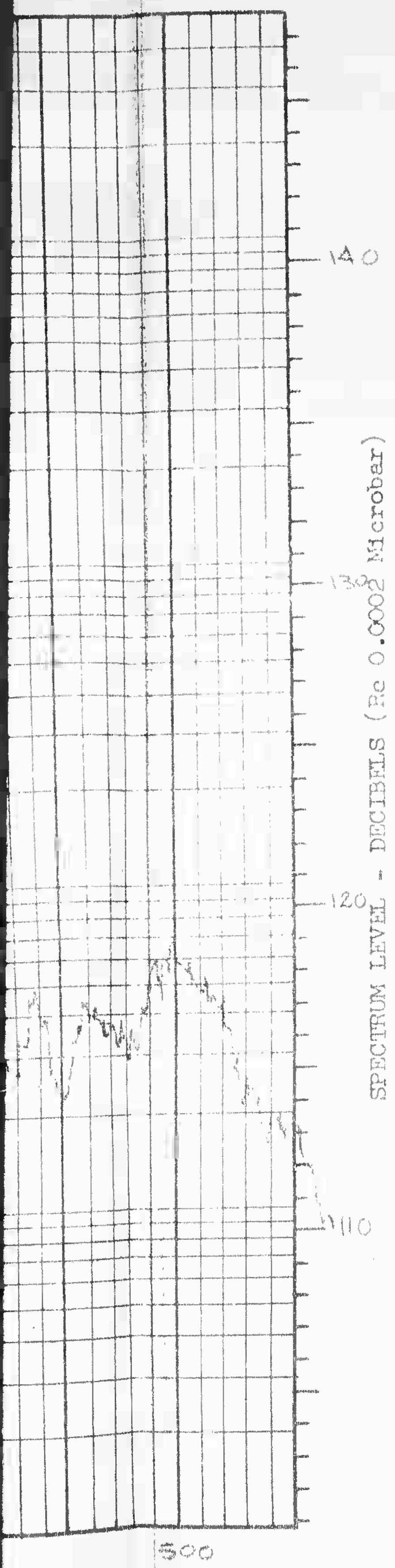


ANALYSIS VARIABLES

Bandwidth

5 cycles from 80 to 550 cps	T_c 4 Sec.	CALC MJM
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	CHECK JGA
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	APR.
		APR.

1

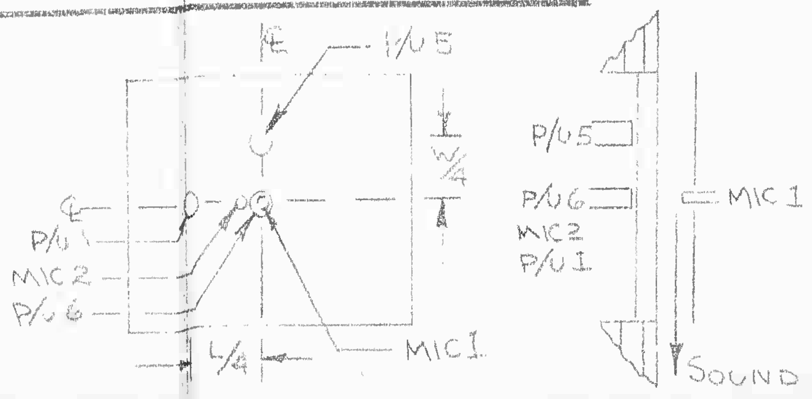


DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM		
EWA No. 5-593	Panel or Specimen No. 1495	
Tape No. 21	Tape Channel 3	Mic. No. 2
Elapsed Test Time +5	Mic. RMS Level at Sonic Lab. V_L = .116 Volts	

CALIBRATION

Tape No. 21	Tape Channel 1	Data Tape RMS Volt V_R = .200
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .47 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .100 ; for Data G_d = .200		
Lab. Gain LG = 1.0	Tape Monitor Gain TMG = $\frac{G_d}{G_c}$ = 2.0	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(2)(1)}\right]^2$ = 5.25 (10^{-3}) psi^2/cps		
Analyzer Attenuator Setting -20 db	Log Converter Setting 0 db	
Calibration Plotted at 5.25 (10^{-3}) psi^2/cps		
Overall Pressure Level Data	Equiv. to 140.5 db SPL	
RMS pressure level = $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.200)}{(2)(1)(.47)}$ = .0308 psi		



CALC	MJM	6-22	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 5 MIN TEST MIC 2 PANEL 1495 PHASE A	VOL I
CHECK	JOA	6/26/61			BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	D2-8084
APR.						PAGE
APR						Fig 179

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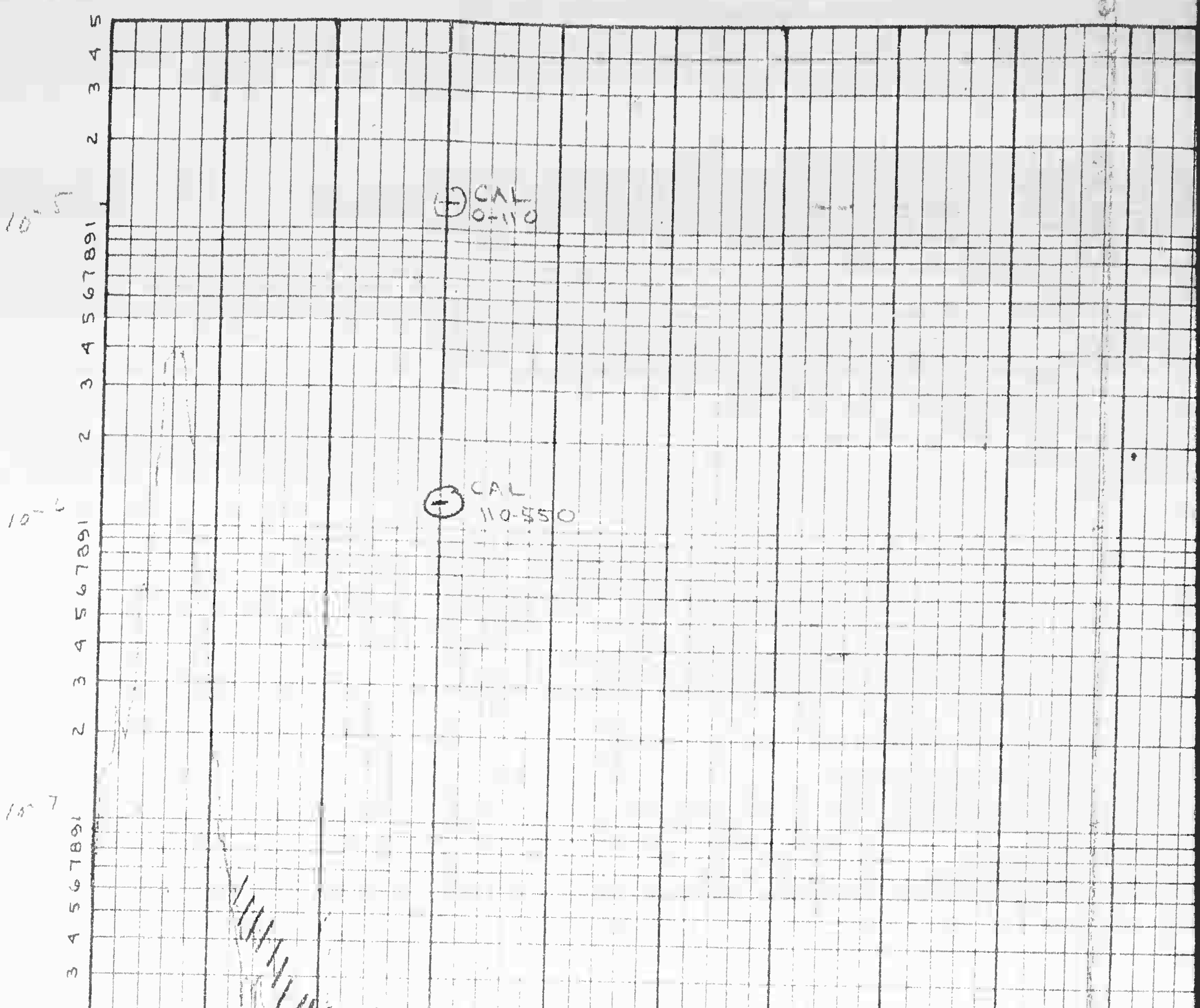
2



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps — T_c 4 Sec.

___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/sec.

___ cycles from ___ to ___ cps — Loop Length 4 Sec.

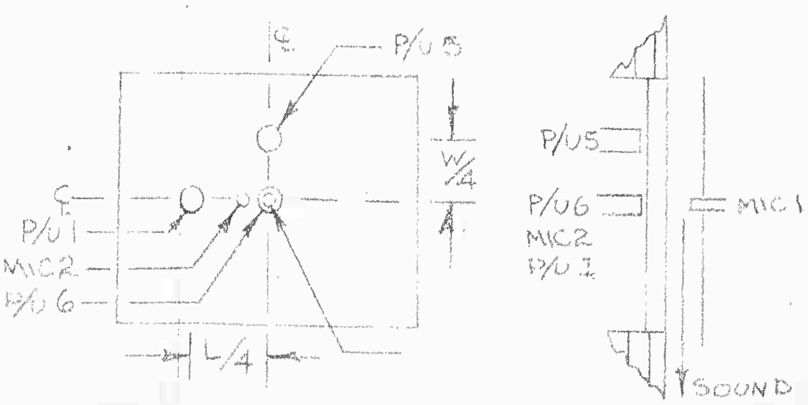
CALC	
CHECK	JOA
APR.	
APR.	

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM.		
EWA No. 5-593	Panel or Specimen No. 1495	
Tape No. 21	Tape Channel 4	Displacement Pickup # 1
Elapsed Test Time +5 MIN	P/U RMS Level at Sonic Lab. V_L = .130 Volts	

CALIBRATION

Tape No. 21	Tape Channel 1	Data Tape RMS Volt V_R = .115
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .47 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .100; for Data G_d = .100		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 1.0$	
Displacement Pickup Sensitivity S = .0707 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S = .0354$		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{(1)(1)}\right]^2 = 1.255\,(10^{-3})$ in.^{2}/cps		
Analyzer Attenuator Setting -20 0-110 -30 110-550 db	Log Converter Setting 0 db	
Calibration Plotted at 1.255 (10^{-5}) 0-110 1.255 (10^{-6}) 110-550 in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0354)(.115)}{(1)(1)(.47)} = .0087$ in.		



CALC	MCM	6-21	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 5 MIN TEST P/U 1 PANEL 1495 PHASE A BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
CHECK	JOA	6/26/61			VOL I
APR.					D2-90084
APR.					PAGE FIG 180

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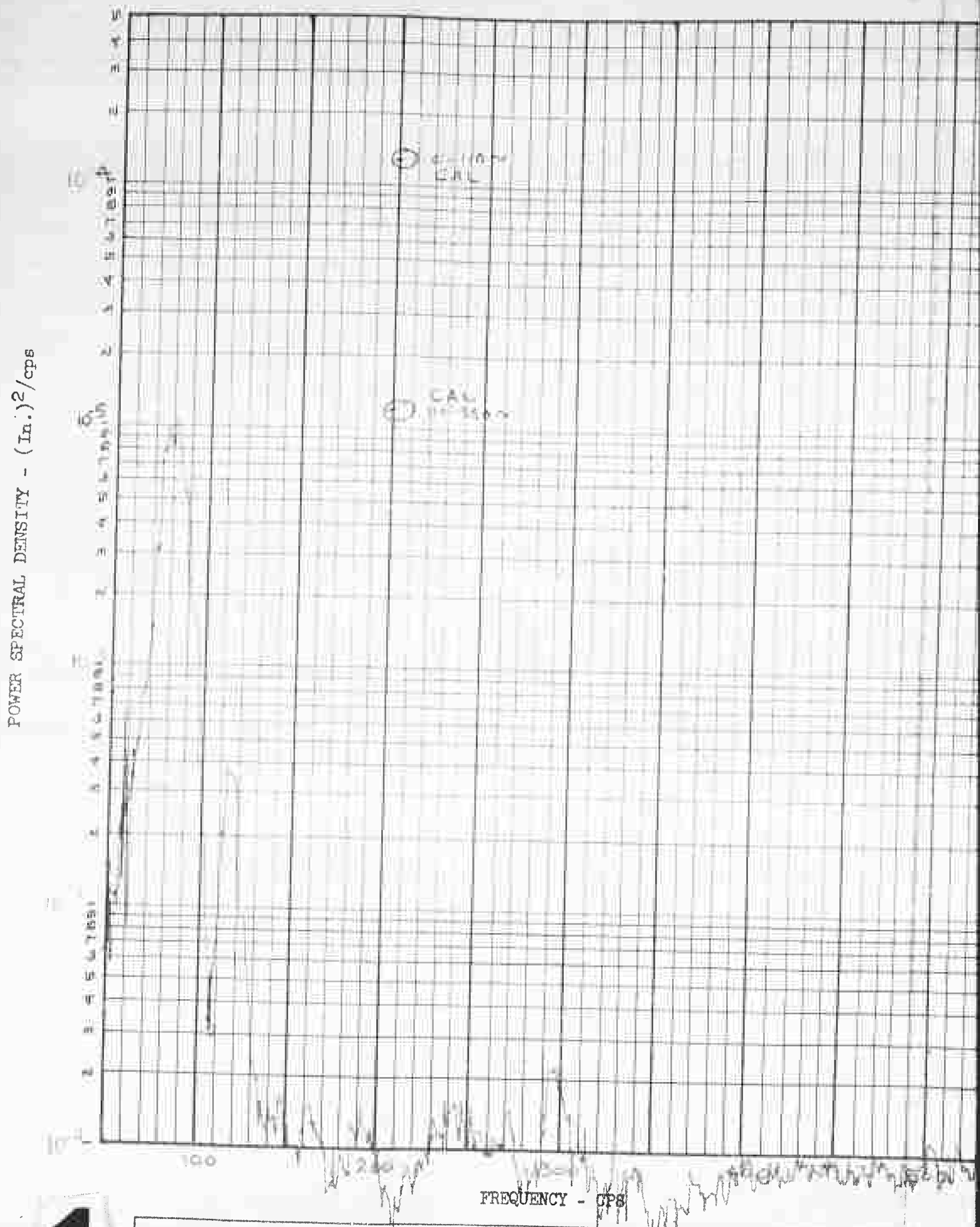


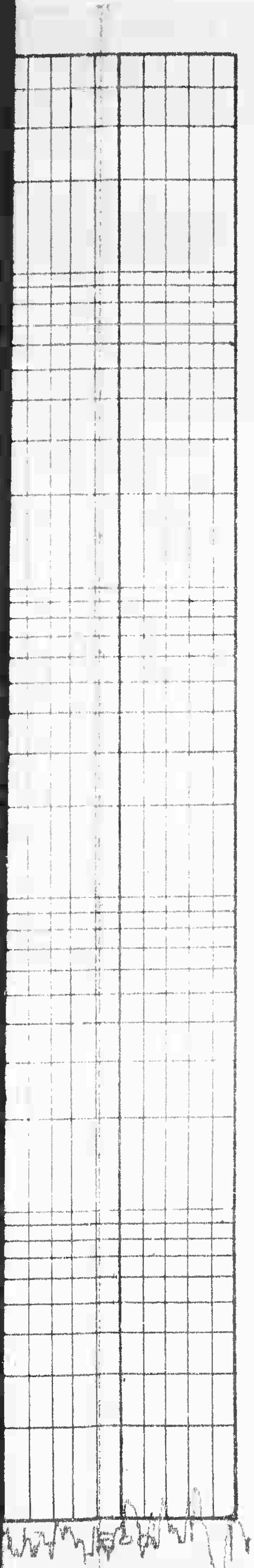
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 4 Sec.
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps	Loop Length 4 Sec.

CALC	MGM
CHECK	JOA
APR.	
APR.	

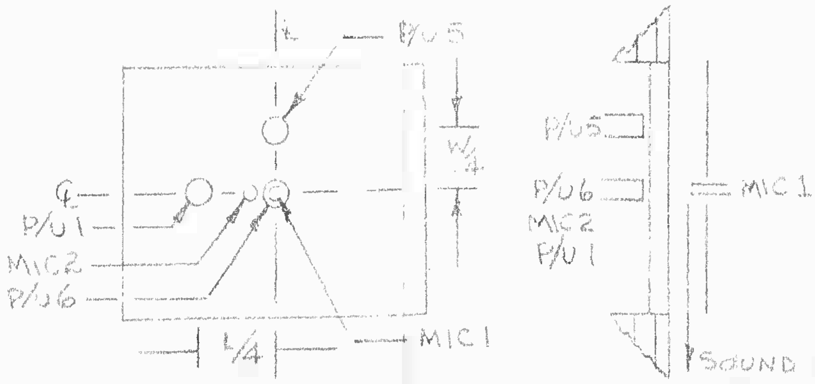


DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM		
EWA No. 5-593	Panel or Specimen No. 1495	
Tape No. 21	Tape Channel 5	Displacement Pickup # 5
Elapsed Test Time +5	P/U RMS Level at Sonic Lab. V_L = .245 Volts	

CALIBRATION

Tape No. 21	Tape Channel 1	Data Tape RMS Volt V_R = .180
Calibration Voltage: V_a = .5 V_{rms} into Line Amp.; V_c = .47 V_{rms} on Tape @200cps		
Line Amplifier Settings: For Calibration G_c = .100; for Data G_d = .100		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0	
Displacement Pickup Sensitivity: S = .0707 in./Volt		
Equivalent of Calibration - in.: $D_c = V_a \cdot S$ = .0354		
Equivalent of Calibration for PSD Plots: $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{(1)(1)}\right]^2 = 1.255\ (10^{-3})$ in.^{2}/cps		
Analyzer Attenuator Setting: -10 0-112 cps; -20 112-550 cps db	Log Converter Setting: 0 db	
Calibration Plotted at: 1.255 (10^{-4}) 0-112 cps; 1.255 (10^{-5}) 112-550 cps in.^{2}/cps		
Overall Deflection Level of Data: RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0354)(.180)}{(1)(1)(.47)}$ = .0136 in.		



CALC	MGM	6-23	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 5 MIL TEST P/U 5 PANEL 1495 PHASE A	Vol. I
CHECK	JOA	6/26/61			BOEING AIRPLANE COMPANY	D2-80084
APR.					SEATTLE 24, WASHINGTON	PAGE FIG 181
APR						

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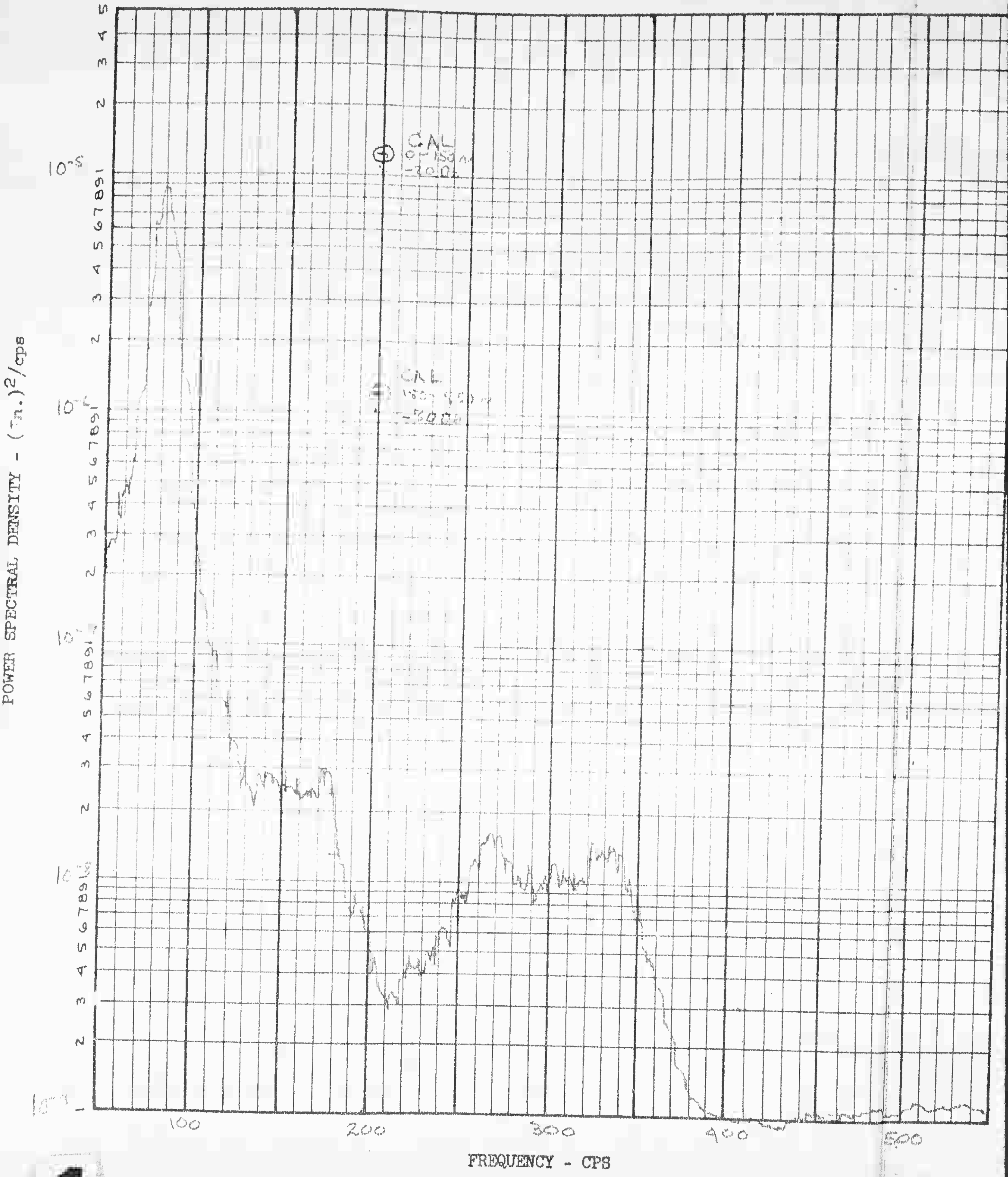


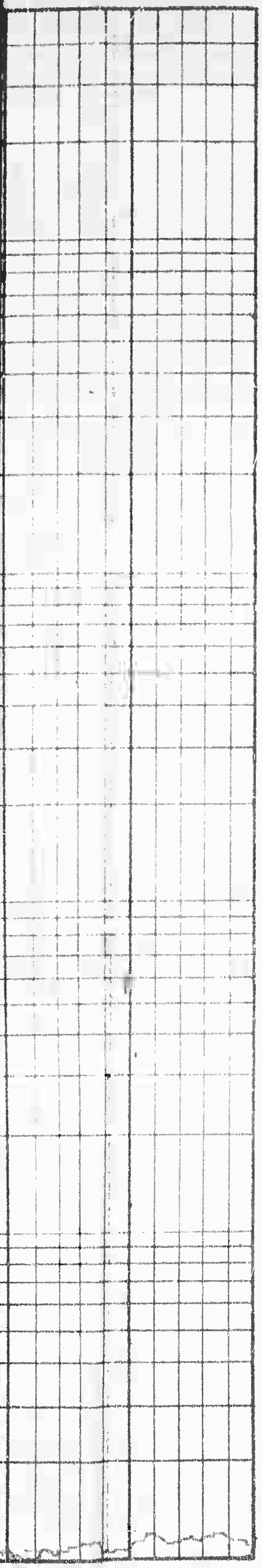
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 4 Sec.
___ cycles from ___ to ___ cps   Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps   Loop Length 4 Sec.

CALC	MCM	6/2
CHECK	JOA	6/2
APR.		
APR.		



500

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM.	
EWA No. 5-593	Panel or Specimen No. 1495

Tape No. 21	Tape Channel 6	Displacement Pickup # 6

Elapsed Test Time +5	P/U RMS Level at Sonic Lab. V_L = .180 Volts

CALIBRATION

Tape No. 21	Tape Channel 1	Data Tape RMS Volt V_R = .155

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .970 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .100 ; for Data G_d = .100

Lab. Gain
LG = 1.0

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .0707 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0354

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0354}{(1)(1)}\right]^2 = 1.255\,(10^{-3}) \quad in.^2/cps$$

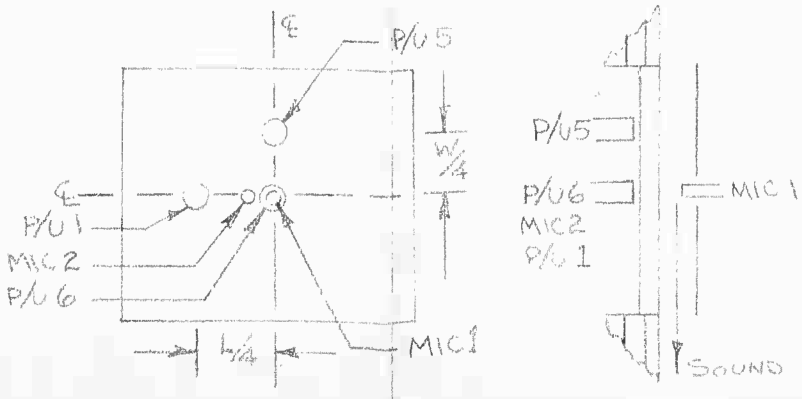
Analyzer Attenuator Setting
-20 0-150
-30 150-550 db

Log Converter Setting
0 db

Calibration Plotted at 1.255 (10^{-5}) 0-150
1.255 (10^{-6}) 150-550 in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{.0354\,(.155)}{(1)(1)\,.97} = .0117 \quad in.$$



CALC	MCM	6/23	REVISED	DATE
CHECK	JOA	6/26/61		
APR.				
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POWER SPECTRAL DENSITY ANALYSIS
OF DISPLACEMENT PICKUP
5 MIN TEST
P/U 6 PANEL 1495 PHASE A
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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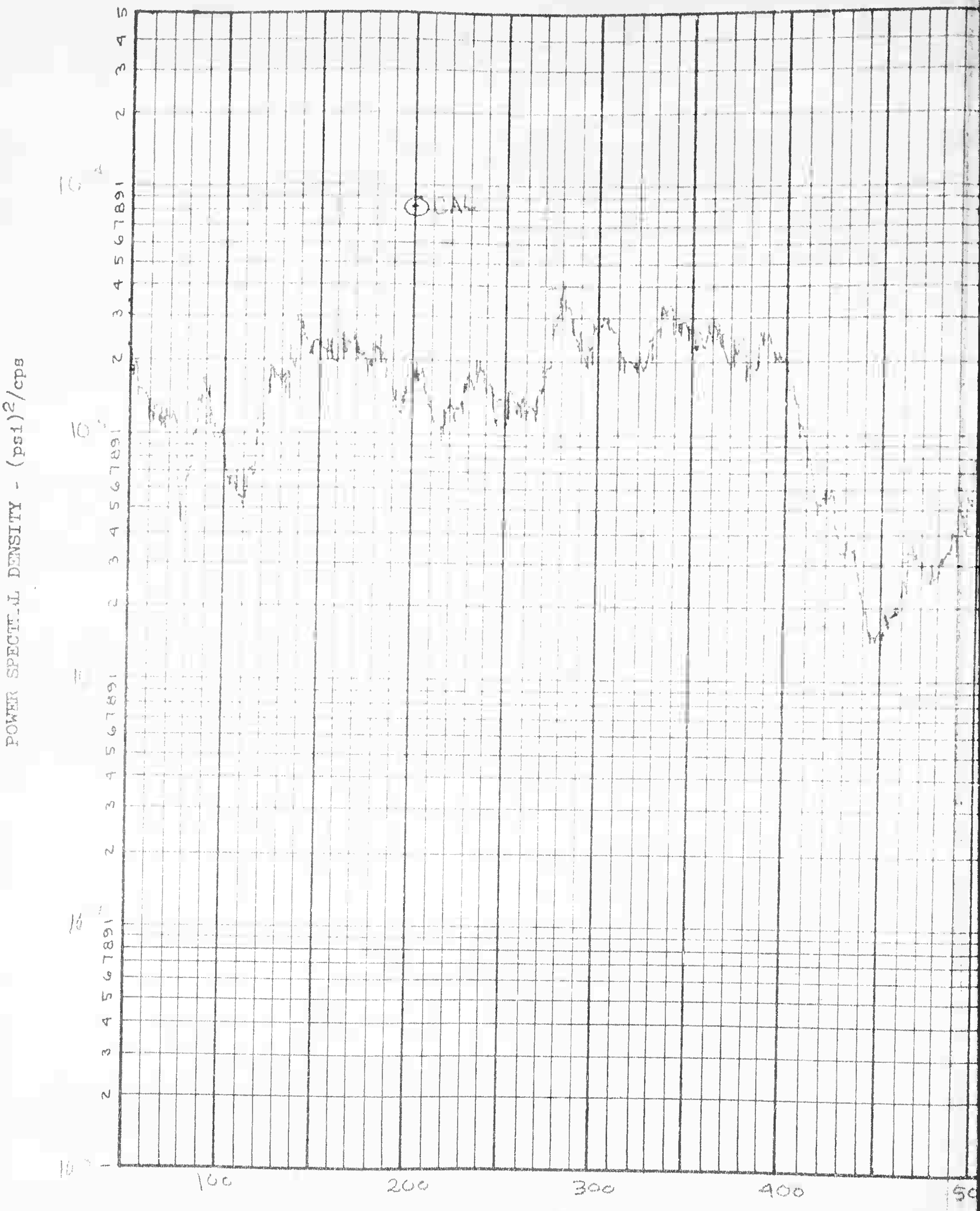


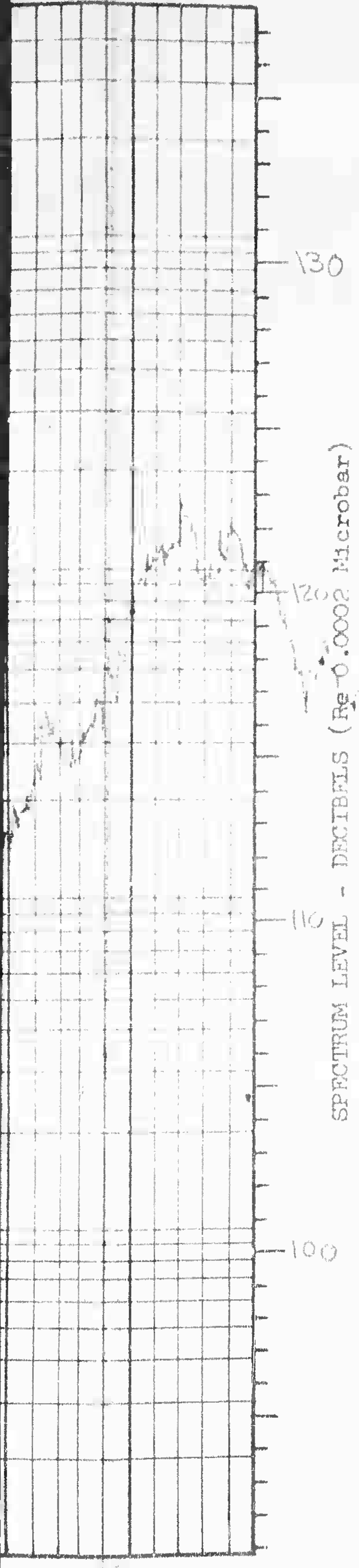
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC	MG
CHECK	S
APR.	
APR.	

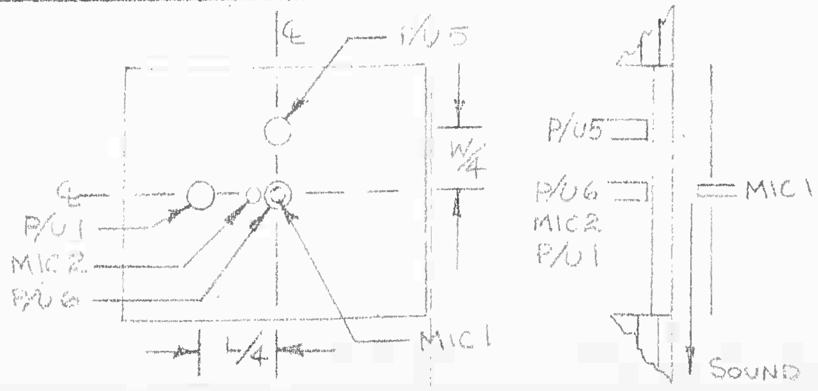


DATA IDENTIFICATION

Test Title PANEL ATTACH. TYPE I PRELIM.		
EWA No. 5-593	Panel or Specimen No. 1495	
Tape No. 25	Tape Channel 1	Mic. No. 1
Elapsed Test Time +55	Mic. RMS Level at Sonic Lab. V_L = .192 Volts	

CALIBRATION

Tape No. 25	Tape Channel 1	Data Tape RMS Volt V_R = .187
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 250 cps		
Line Amplifier Settings For Calibration G_c = 500 ; for Data G_d = 250		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .50	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(.5)(1)}\right]^2 = 8.41(10^{-2})$ psi^2/cps		
Analyzer Attenuator Setting -30 db	Log Converter Setting 0 db	
Calibration Plotted at $8.41(10^{-5})$ psi^2/cps		
Overall Pressure Level Data RMS pressure level $= \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ $= \frac{.145(.187)}{(.5)(1)(.5)}$ = .1085 psi	Equiv. to 151.5 db SPL	



CALC	mem	6-23	REVISED	DATE	
CHECK	JOA	6/26/61			
APR.					
APR.					

POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT
55 MIN TEST
MIC I PANEL 1495 PHASE B
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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PAGE FIG 183

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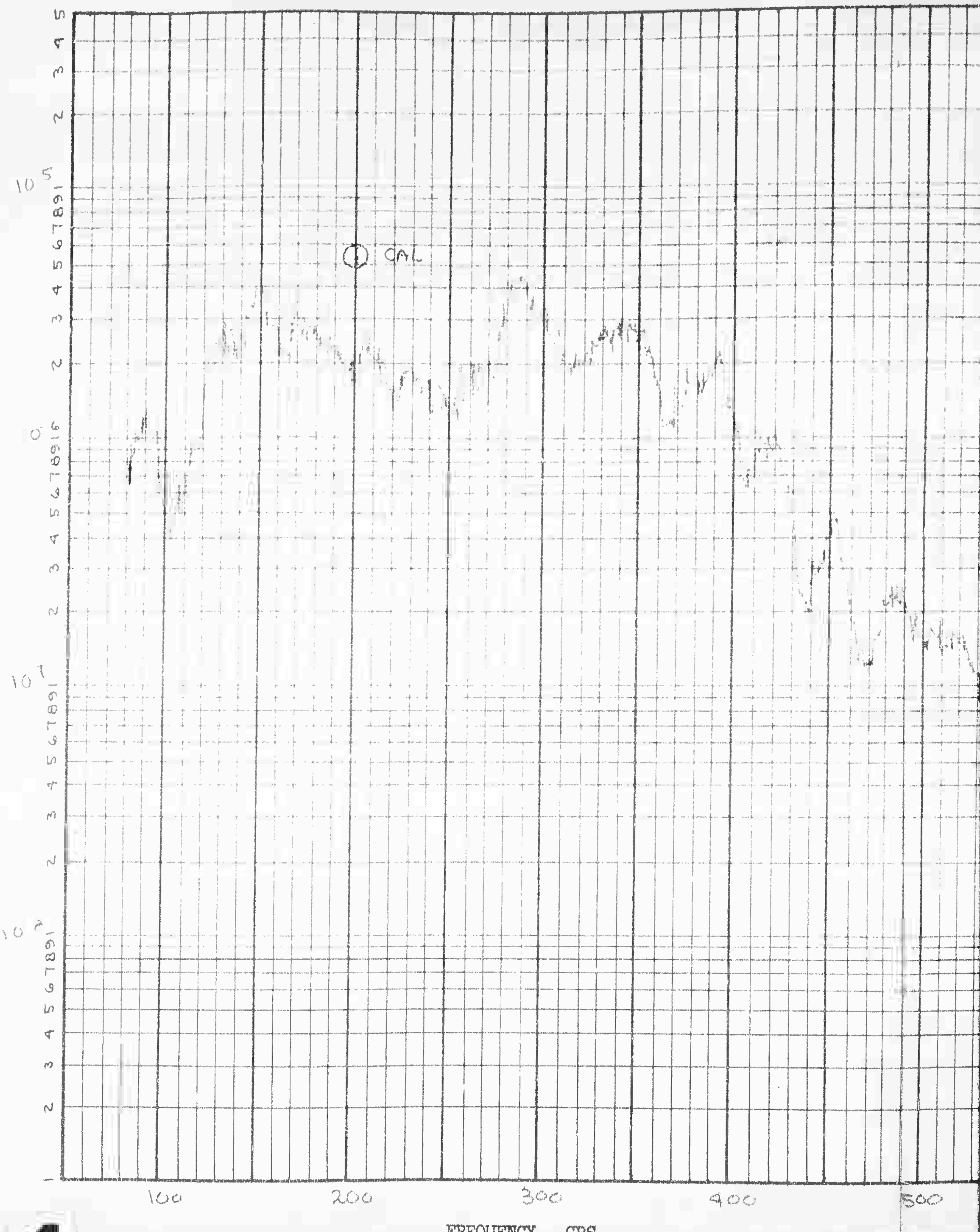
2



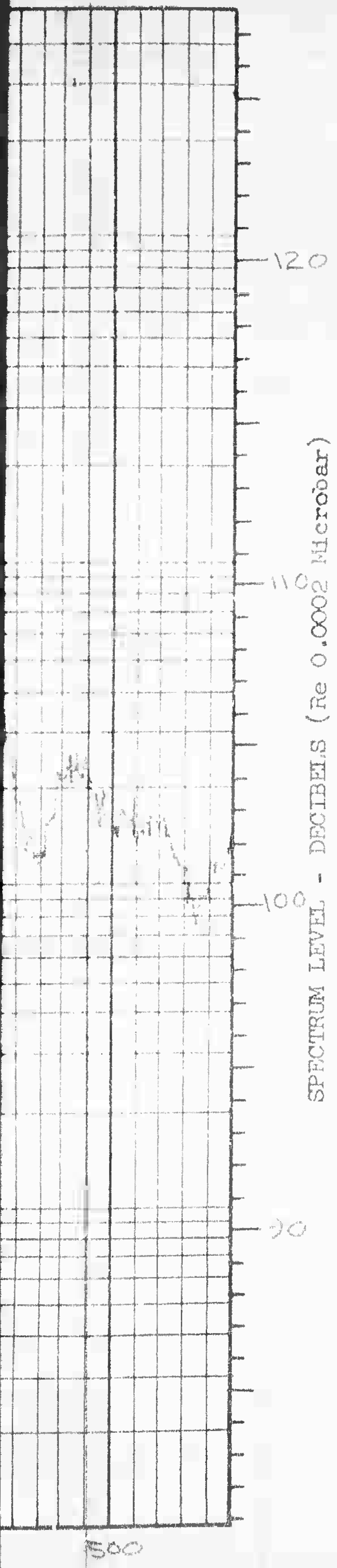
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 80 to 550 cps T_c 4 Sec.
___ cycles from ___ to ___ cps Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps Loop Length 4 Sec.

CALC	EGGERS
CHECK	SOA
APR.	
APR.	

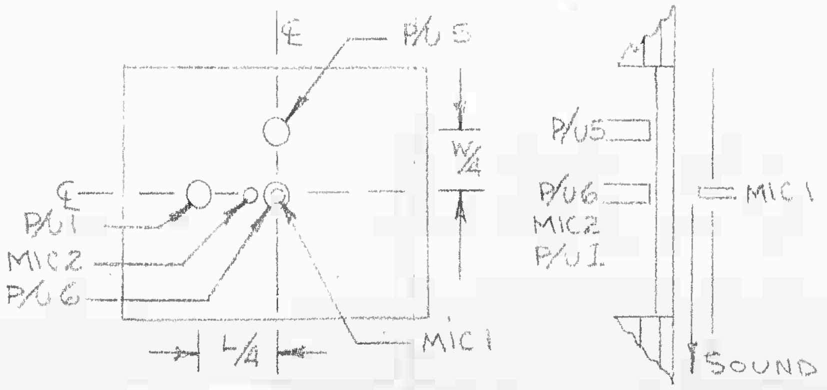


DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM.		
EWA No.: 5-593	Panel or Specimen No.: 1495	
Tape No.: 25	Tape Channel: 2	Mic. No.: 2
Elapsed Test Time: +55	Mic. RMS Level at Sonic Lab. V_L = — Volts	

CALIBRATION

Tape No. 25	Tape Channel 1	Data Tape RMS Volt V_R = .228
Calibration Voltage: V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings: For Calibration G_c = .500 ; for Data G_d = 1.000		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2.0	
Microphone Sensitivity: S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi: $P_c = V_a \cdot S$ = .145		
Equivalent of Calibration for PSD Plots: $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(2.0)(1.0)}\right]^2 = 5.25(10^{-3})$ psi²/cps		
Analyzer Attenuator Setting -30 db	Log Converter Setting 0 db	
Calibration Plotted at 5.25 × 10⁻⁶ psi²/cps		
Overall Pressure Level Data: RMS pressure level $= \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{.145(.228)}{(2)(1)(.5)}$ = .0331 psi	Equiv. to 141.3 db SPL	



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CALC	EGGERS	6-2-61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT
CHECK	JSOA	6/26/61			55 MIN TEST MIC 2 PANEL 1495 PHASE B
APR.					BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
APR.					VOL I / D2-80084 / PAGE FIG 184

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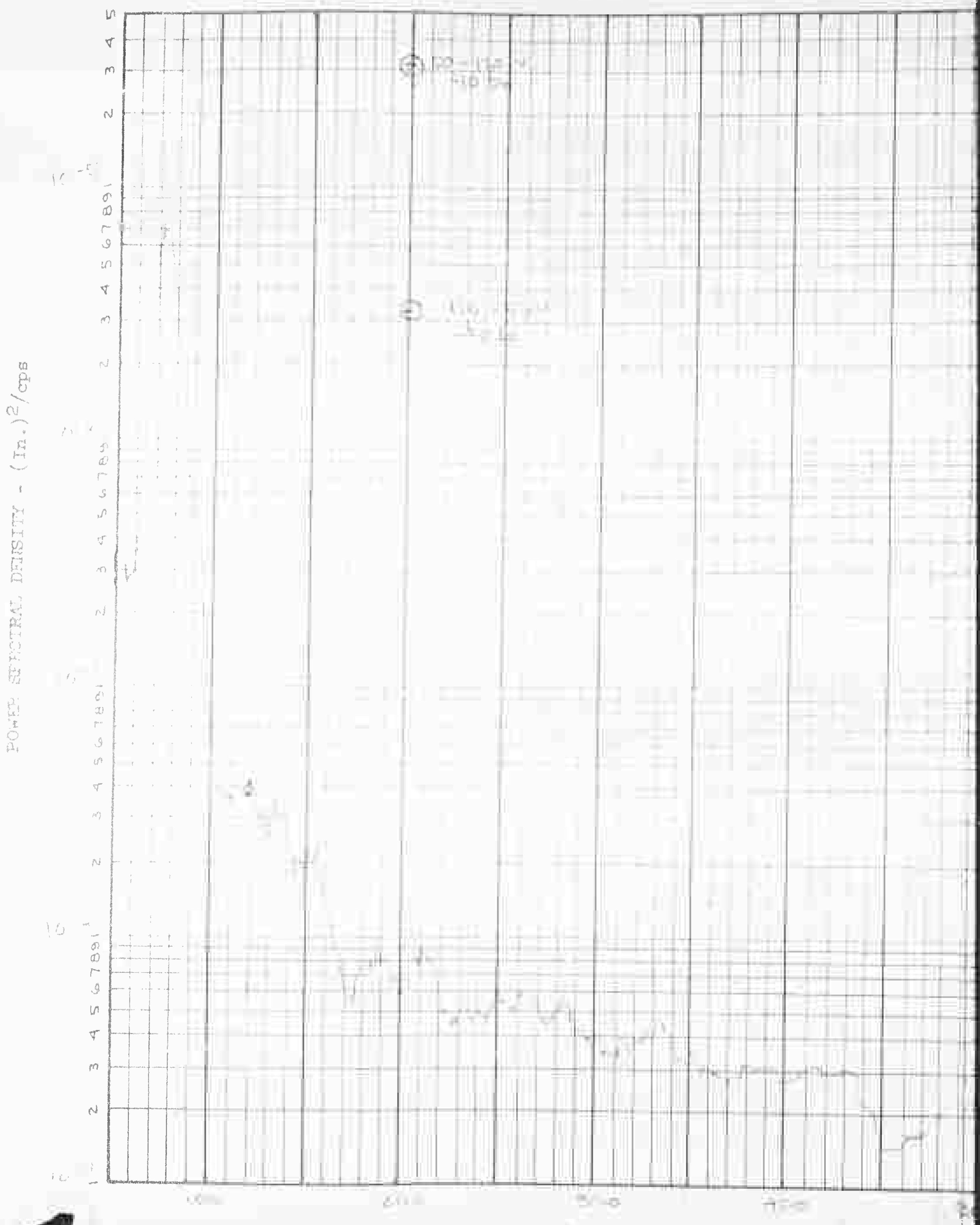


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 900 cps — T_c 4 Sec.
____ cycles from ____ to ____ cps — Anal. Rate 1.25 cps/sec.
____ cycles from ____ to ____ cps — Loop Length 4 Sec.

CALC
CHECK
APR.
APR

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I [illegible]	
EWA No. 5-5[illegible]	Panel or Specimen No. 1475

Tape No. 25	Tape Channel [illegible]	Displacement Pickup # 1

Elapsed Test Time +[illegible]	P/U RMS Level at Sonic Lab. V_L = [illegible] Volts

CALIBRATION

Tape No. 2[illegible]	Tape Channel 7	Data Tape RMS Volt V_R = .[illegible]

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 2[illegible] cps

Line Amplifier Settings
For Calibration G_c = .500; for Data G_d = .5[illegible]

Lab. Gain $LG = 1.0$	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.[illegible]

Displacement Pickup Sensitivity
S = .[illegible]4 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = [illegible]

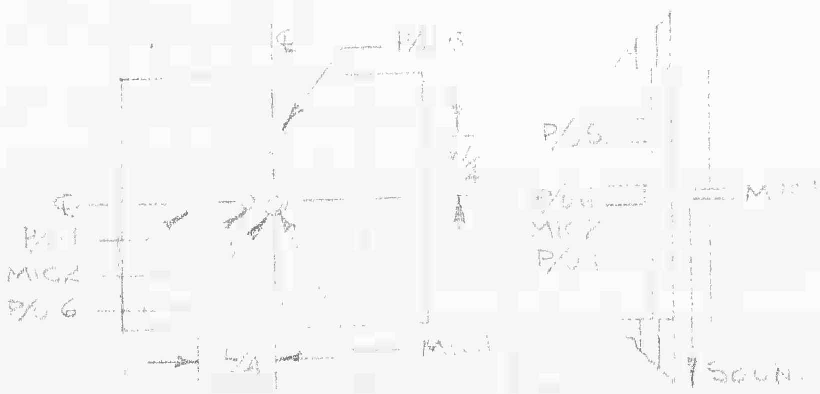
Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = [illegible] in.^{2}/cps

Analyzer Attenuator Setting −10 [illegible] db	Log Converter Setting 0 db

Calibration Plotted at [illegible] in.^{2}/cps

Overall Deflection Level of Data

RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] in.



CALC	[illegible]	[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 55 MIL TEST P/U 1 PANEL 1495 PHASE B BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I [illegible] PAGE FIG 185
CHECK	SOA	6/24/6[illegible]				
APR						
APR						

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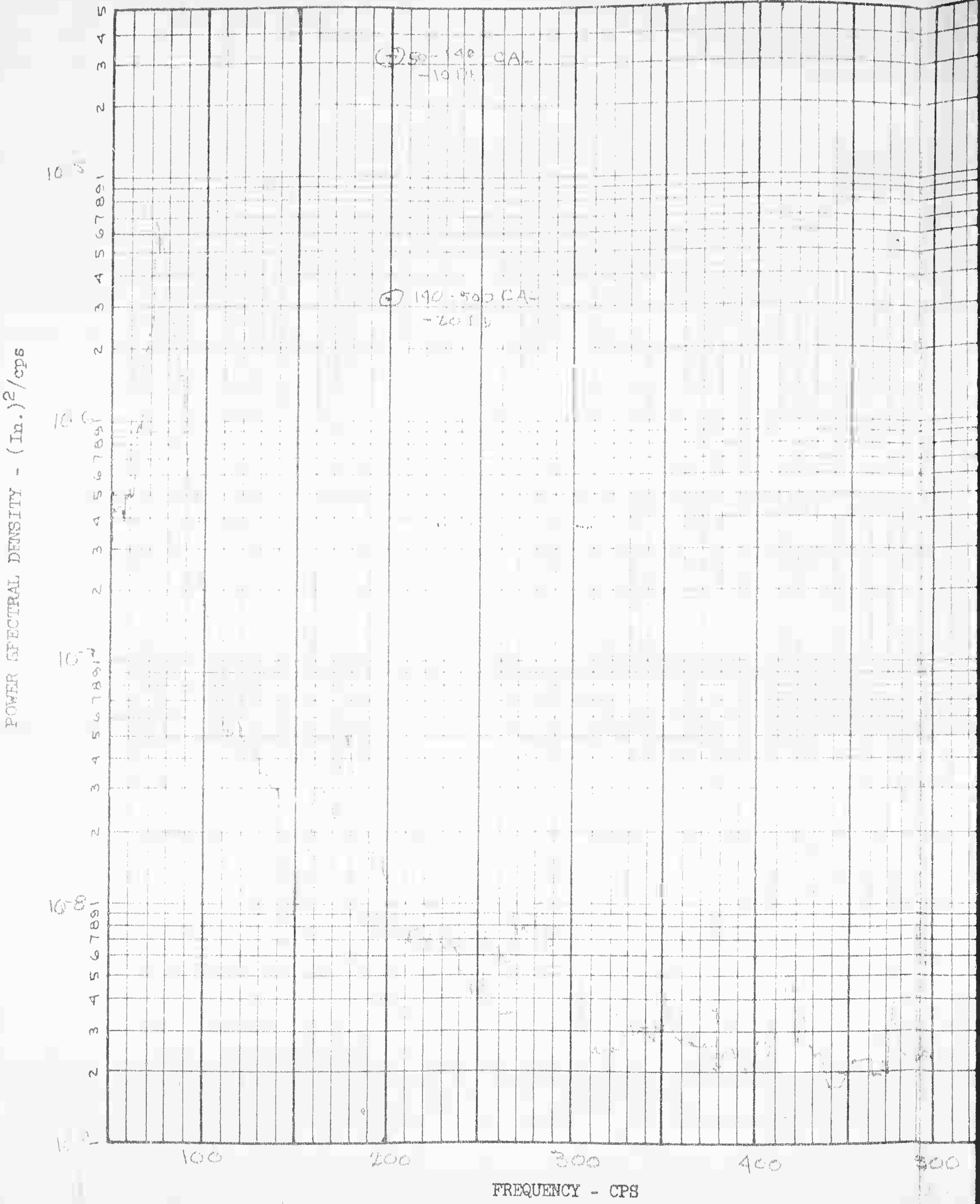


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps		T_c 4 Sec.	
___ cycles from ___ to ___ cps		Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps		Loop Length 4 Sec.	

CALC.	
CHECK	
APR.	
APR.	

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE E PREUM	
EWA No. 5-595	Panel or Specimen No. 1495

Tape No. 25	Tape Channel 4	Displacement Pickup # 5

Elapsed Test Time +55	P/U RMS Level at Sonic Lab. V_L = .300 Volts

CALIBRATION

Tape No. 25	Tape Channel 7	Data Tape RMS Volt V_R = .285

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .500

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

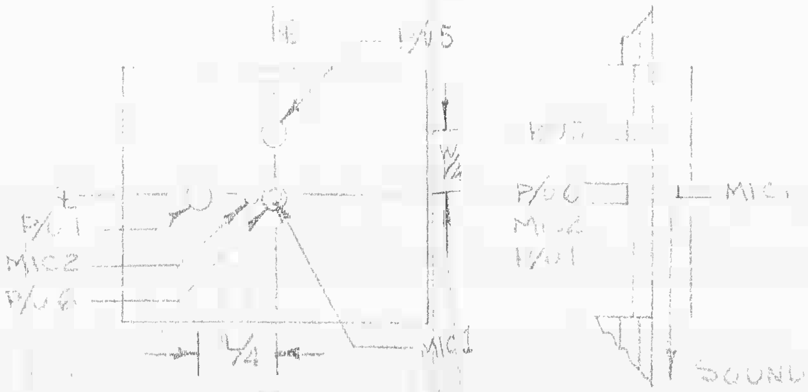
Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{.0177}{(1)(1)}\right)^2$ = 3.1 (10^-4) in.^{2}/cps

Analyzer Attenuator Setting -10 50-142 db -20 12-500	Log Converter Setting 0 db

Calibration Plotted at [illegible] in.^{2}/cps

Overall Deflection Level of Data

RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] = .0101 in.



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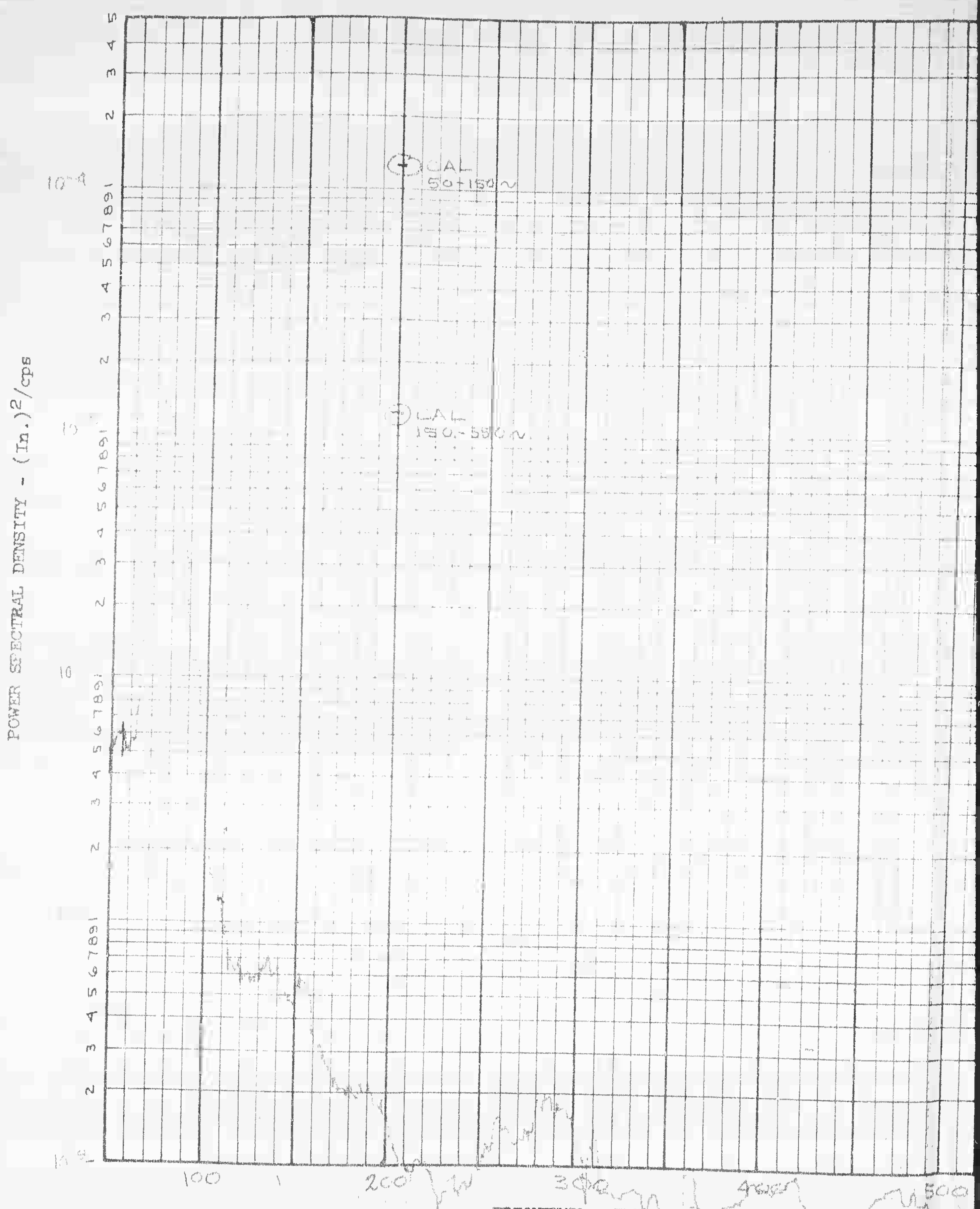
CALC	[illegible]	[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	Vol. I
CHECK	BDA	6/26/61			P/U 5 PANEL 1495 PHASE B	[illegible]
APR					BOEING AIRPLANE COMPANY	PAGE
APR					SEATTLE 24, WASHINGTON	FIG 186

2-5353-7-9



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 4 Sec.
___ cycles from ___ to ___ cps Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps Loop Length 4 Sec.

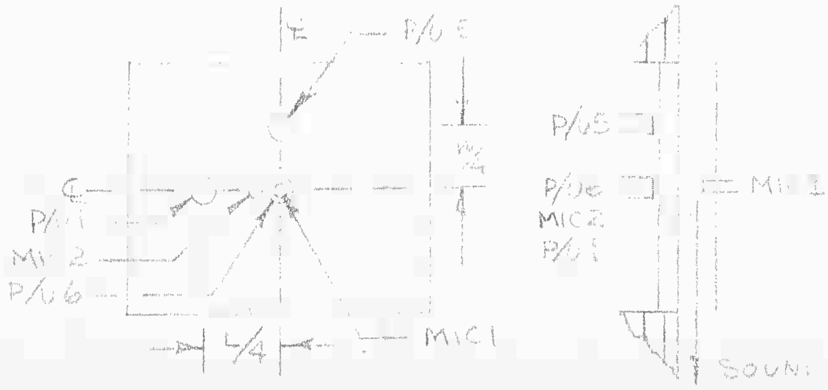
CALC	
CHECK	
APR.	
APR.	

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM.		
EWA No. 5-593	Panel or Specimen No. 149S	
Tape No. 25	Tape Channel 5	Displacement Pickup # 6
Elapsed Test Time +55	P/U RMS Level at Sonic Lab. V_L = .390 Volts	

CALIBRATION

Tape No. 25	Tape Channel 7	Data Tape RMS Volt V_R = .210
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @200cps		
Line Amplifier Settings For Calibration G_c = .500; for Data G_d = .250		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .50	
Displacement Pickup Sensitivity S = .0354in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .0177		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(.5)(1)}\right]^2$ = 1.25(10⁻³) in.²/cps		
Analyzer Attenuator Setting 10 db	Log Converter Setting 0 db	
Calibration Plotted at 1.225×10^{-4} (55-150) 1.225×10^{-5} (150-500) in.²/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.210)}{(.5)(1)(.5)}$ = .0149 in.		



~500

CALC		6-3	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 55 MIN. TEST P/U 6, PANEL 149S PHASE B	VOL I
CHECK	Sum	6/10/4				D2-
APR.					BOEING AIRPLANE COMPANY	PAGE
APR					SEATTLE 24, WASHINGTON	Fig. 187

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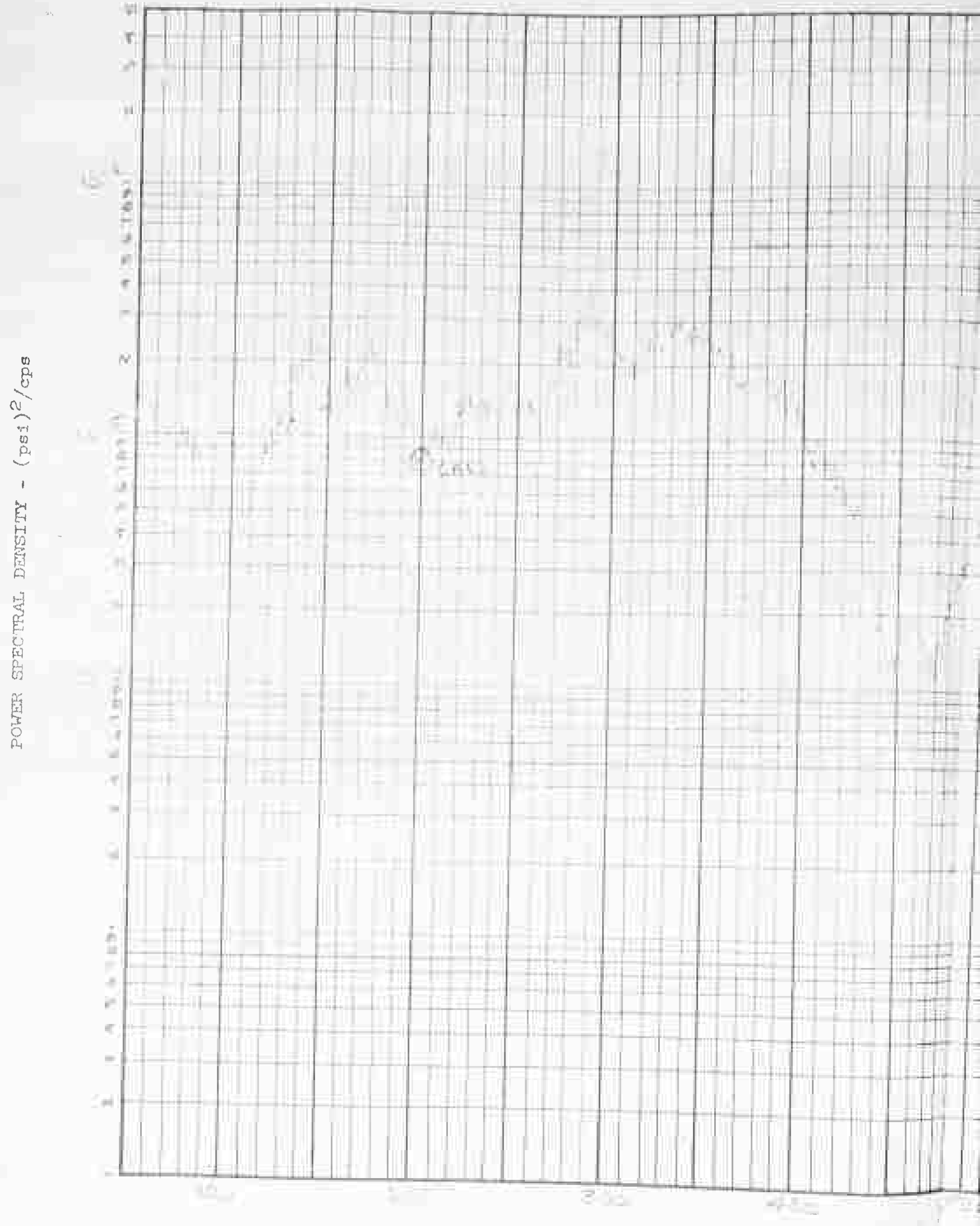

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 4 Sec.
___ cycles from ___ to ___ cps Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps Loop Length 4 Sec.

CALC
CHECK
APR.
APR

DATA IDENTIFICATION

Test Title		
D... PANEL ATTACHM... - TYPE I		
EWA No.	Panel or Specimen No. 1497	
Tape No. 26	Tape Channel 1	Mic. No. 1
Elapsed Test Time 5 MIN	Mic. RMS Level at Sonic Lab. V_L = .2... Volts	

CALIBRATION

Tape No. 26	Tape Channel 7	Data Tape RMS Volt V_R = .178

Calibration Voltage
V_a = ... V_{rms} into Line Amp.; V_c = ... V_{rms} on Tape ... cps

Line Amplifier Settings
For Calibration G_c = ... ; for Data G_d = ...

Lab. Gain LG = ...	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = ...

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms ... db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = ...

Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \text{...} \quad psi^2/cps$$

Analyzer Attenuator Setting ... db	Log Converter Setting ... db

Calibration Plotted at ... psi^2/cps

Overall Pressure Level Data — Equiv. to ... db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \text{...} \quad psi$$

SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

CALC	...	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT	Vol I
CHECK	... 6-26			MIC #1 PANEL 1497 PHASE A	
APR.				BOEING AIRPLANE COMPANY	PAGE
APR.				SEATTLE 24, WASHINGTON	Fig 198

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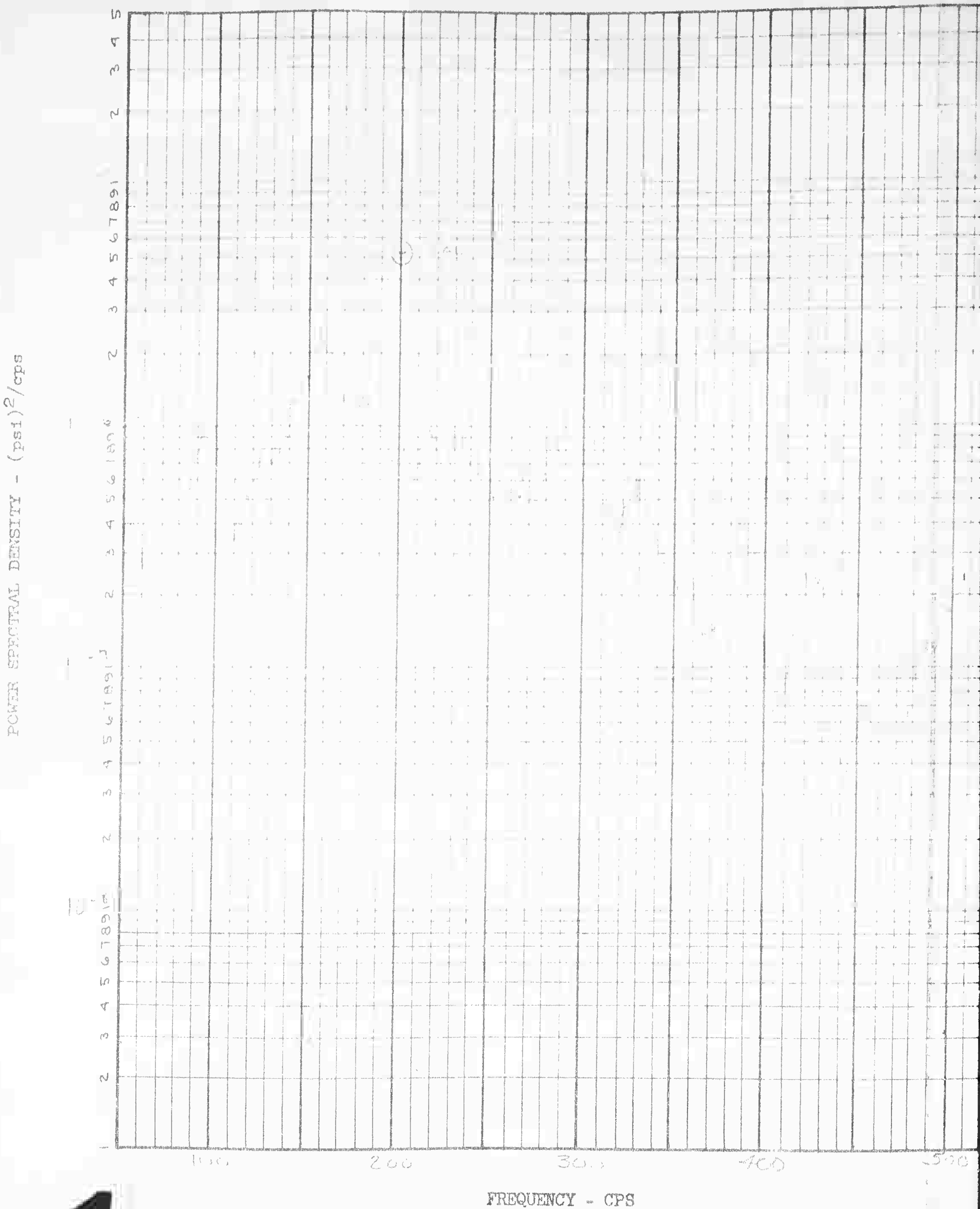


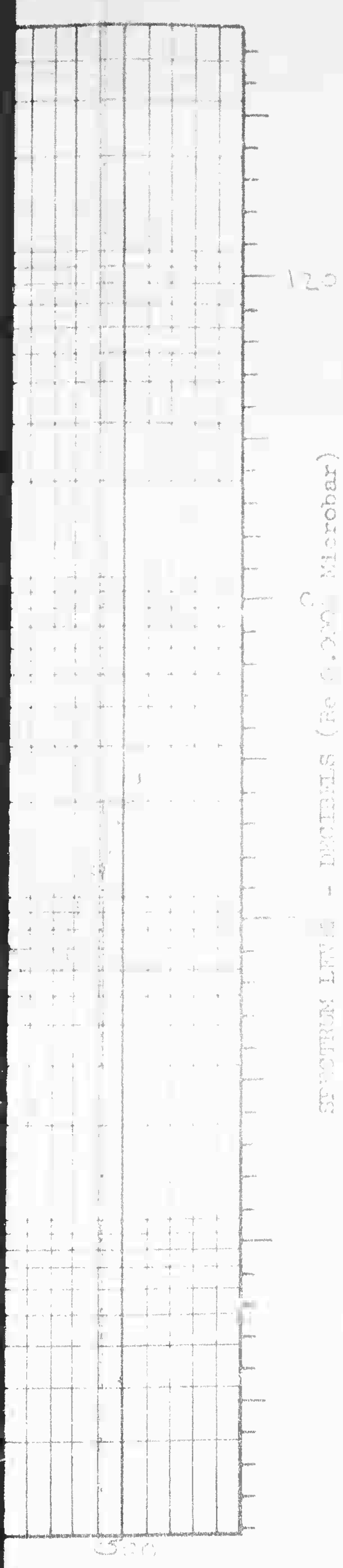
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 5	to 500	cps	T_c 4	Sec.	
___ cycles from ___	to ___	cps	Anal. Rate 1.25	cps/Sec.	
___ cycles from ___	to ___	cps	Loop Length 4	Sec.	

CALC	[illegible]
CHECK	[illegible]
APR.	
APR.	



DATA IDENTIFICATION

Test Title: D.S. PANEL AT [illegible] - TYPE [illegible]		
EWA No. 5[illegible]	Panel or Specimen No. [illegible]	
Tape No. 26	Tape Channel 2	Mic. No. 2
Elapsed Test Time [illegible]	Mic. RMS Level at Sonic Lab. V_L = [illegible] Volts	

CALIBRATION

Tape No. 26	Tape Channel 7	Data Tape RMS Volt V_R = .1[illegible]

Calibration Voltage

V_a = [illegible] V_{rms} into Line Amp.: V_c = .430 V_{rms} on Tape [illegible] cps

Line Amplifier Settings

For Calibration G_c = [illegible] ; for Data G_d = [illegible]

Lab. Gain LG = 20	Tape Monitor Gain TMG = $\frac{G_d}{G_c}$ = [illegible]

Microphone Sensitivity

S = .20[illegible] psi/Volt or 1 Volt rms = [illegible] db [illegible]

Equivalent of Calibration - psi

$P_c = V_a \cdot S$ = [illegible]

Equivalent of Calibration for PSD Plots

$\left(\frac{P_c}{(TMG)(LG)}\right)$ [illegible] psi²/cps

Analyzer Attenuator Setting [illegible] db	Log Converter Setting [illegible] db

Calibration Plotted at [illegible] psi²/cps

Overall Pressure Level Data	Equiv. to [illegible] db SPL

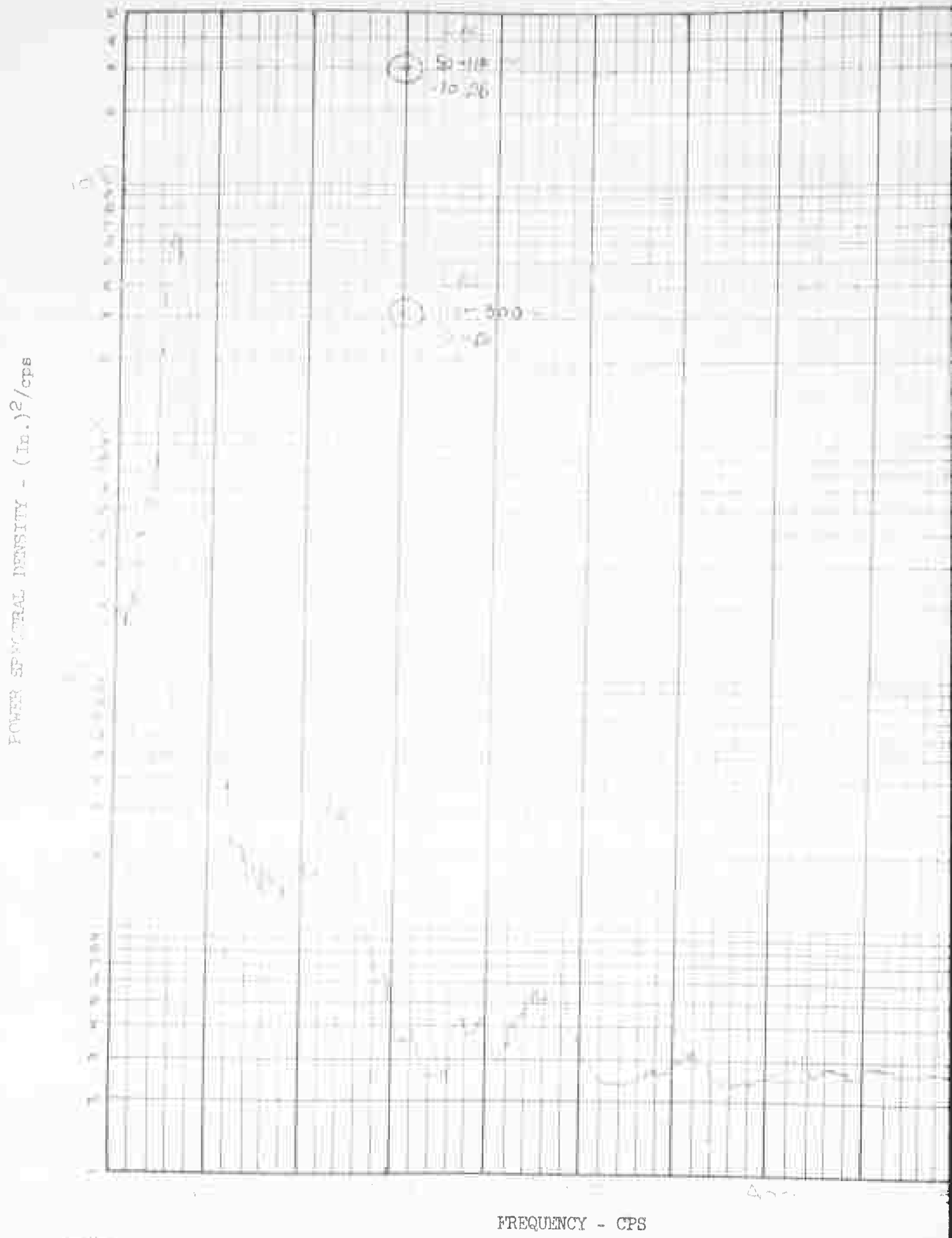
$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$$

= [illegible] = [illegible] psi

2

CALC	[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT MIC # 2 PANEL 1497 PHASE A BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I
CHECK	[illegible]				D2 [illegible]
APR.					PAGE
APR.					[illegible]189

2-5353-7-8



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c [illegible] Sec.
___ cycles from ___ to ___ cps	Anal. Rate 1.26 cps/sec.
___ cycles from ___ to ___ cps	Loop Length 4 Sec.

CALC

CHECK

APR.

APR

DATA IDENTIFICATION

Test Title	
EWA No.	Panel or Specimen No.
Tape No.	Tape Channel / Displacement Pickup #
Elapsed Test Time	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No.	Tape Channel	Data Tape RMS Volt V_R =

Calibration Voltage

V_a = Vrms into Line Amp.; V_c = rms on cps

Line Amplifier Settings

For Calibration ; for Data

Lab. Gain

LG = ; Tape Monitor Gain

Displacement Pickup Sensitivity

S = in./Volt

Equivalent of Calibration - in

Equivalent of Calibration for PSD Plots

$$\left[\frac{.0175}{(TMG)(LG)}\right]^2$$

Analyzer Attenuator Setting ; Log Converter Setting db

Calibration Plotted at

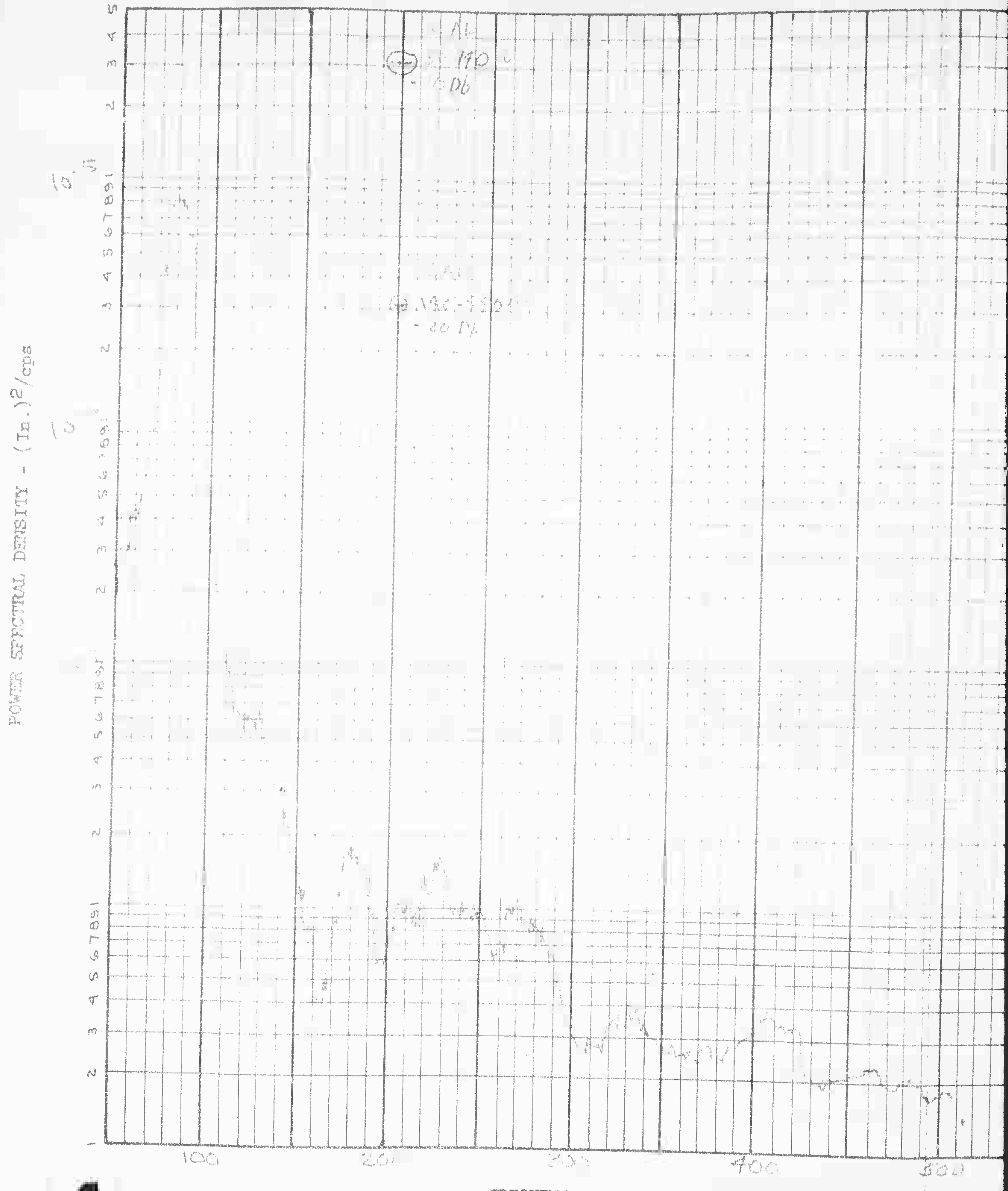
Overall Deflection Level of Data

RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = in

2

			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CALC	MCM					
CHECK					BOEING AIRPLANE COMPANY	
APR.					SEATTLE 24, WASHINGTON	PAGE
APR						FIG 190

2-5353-7-9



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps				T_c	4	Sec.
___ cycles from ___ to ___ cps				Anal. Rate	1.25	cps/sec.
___ cycles from ___ to ___ cps				Loop Length	4	Sec.

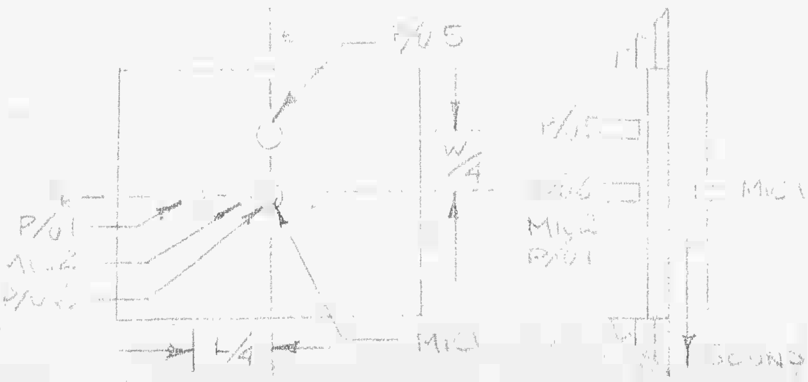
CALC RCM
CHECK JBT
APR.
APR.

DATA IDENTIFICATION

Test Title D.S. PANEL ARRANGEMENT - TYPE I		
EWA No. 5273	Panel or Specimen No. 1417	
Tape No. 26	Tape Channel 4	Displacement Pickup # 5
Elapsed Test Time 5 MIN.	P/U RMS Level at Sonic Lab. V_L = .350 Volts	

CALIBRATION

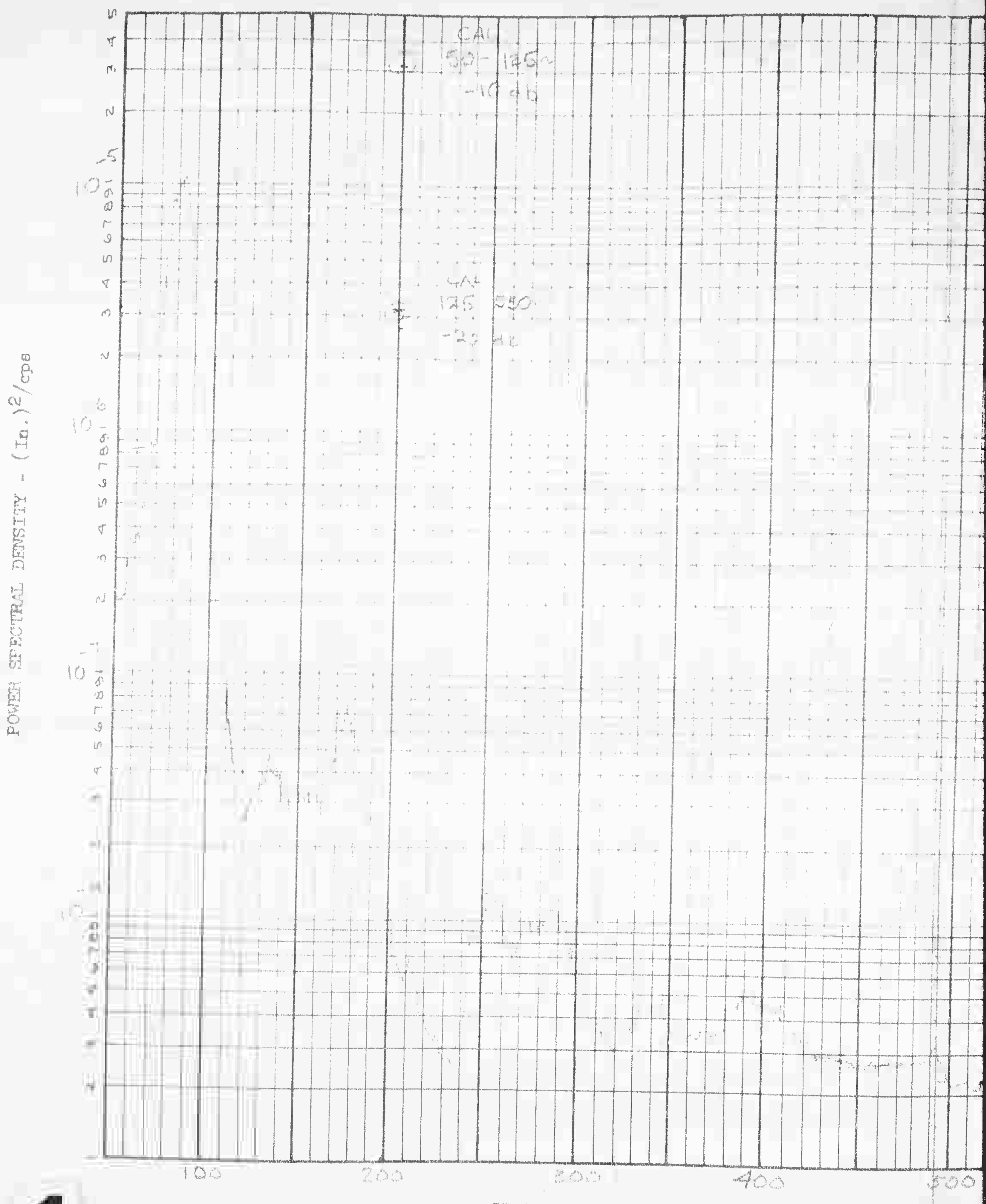
Tape No. 26	Tape Channel 7	Data Tape RMS Volt V_R = .340
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .490 V_{rms} on Tape [illegible] cps		
Line Amplifier Settings For Calibration G_c = .500 ; for Data G_d = .5		
Lab. Gain LG = 1.0	Tape Monitor Gain TMG = $\frac{G_d}{G_c}$ = 1.0	
Displacement Pickup Sensitivity S = .035 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = 0.0175		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = 2.0[illegible] $\times 10^{-4}$ in.^{2}/cps		
Analyzer Attenuator Setting [illegible] db	Log Converter Setting 0 db	
Calibration Plotted at [illegible] in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] in.		



CALC	BCM	4-53	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP P/U # 5 PANEL #1 TEST PHASE "A" BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I
CHECK	JBT	6/21/61				D2-3[illegible]
APR.						PAGE FIG 191
APR						

2-5353-7-9

2



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps — T_c 4 Sec.
___ cycles from ___ to ___ cps — Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps — Loop Length 4 Sec.

CALC	CBT
CHECK	
APR.	
APR.	

DATA IDENTIFICATION

Test Title D.S. PANEL ATTACHMENT - TYPE I	
EWA No. 5-573	Panel or Specimen No. 1497

Tape No. 26	Tape Channel 5	Displacement Pickup # 6

Elapsed Test Time 5 MIN.	P/U RMS Level at Sonic Lab. V_L = .370 Volts

CALIBRATION

Tape No. 26	Tape Channel 7	Data Tape RMS Volt V_R = .370

Calibration Voltage
V_a = .50 V_{rms} into Line Amp.; V_c = [illegible] V_{rms} on Tape @ [illegible] cps

Line Amplifier Settings
For Calibration G_c = [illegible]; for Data G_d = [illegible]

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = [illegible]

Displacement Pickup Sensitivity
S = .035 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0175

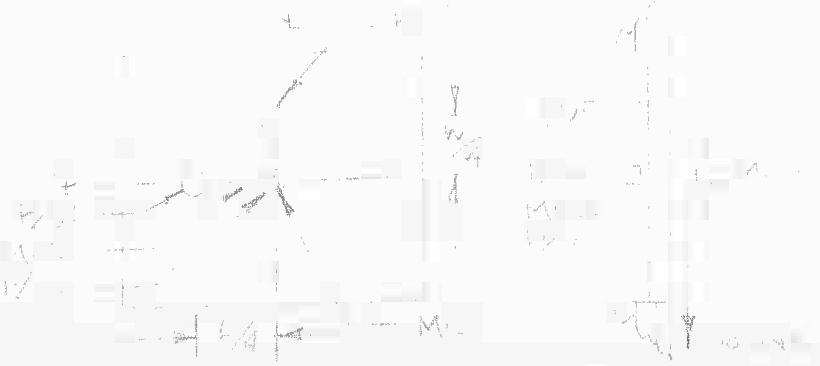
Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = [illegible] in.^{2}/cps

Analyzer Attenuator Setting [illegible] db
Log Converter Setting db

Calibration Plotted at [illegible] in.^{2}/cps

Overall Deflection Level of Data

RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] in.



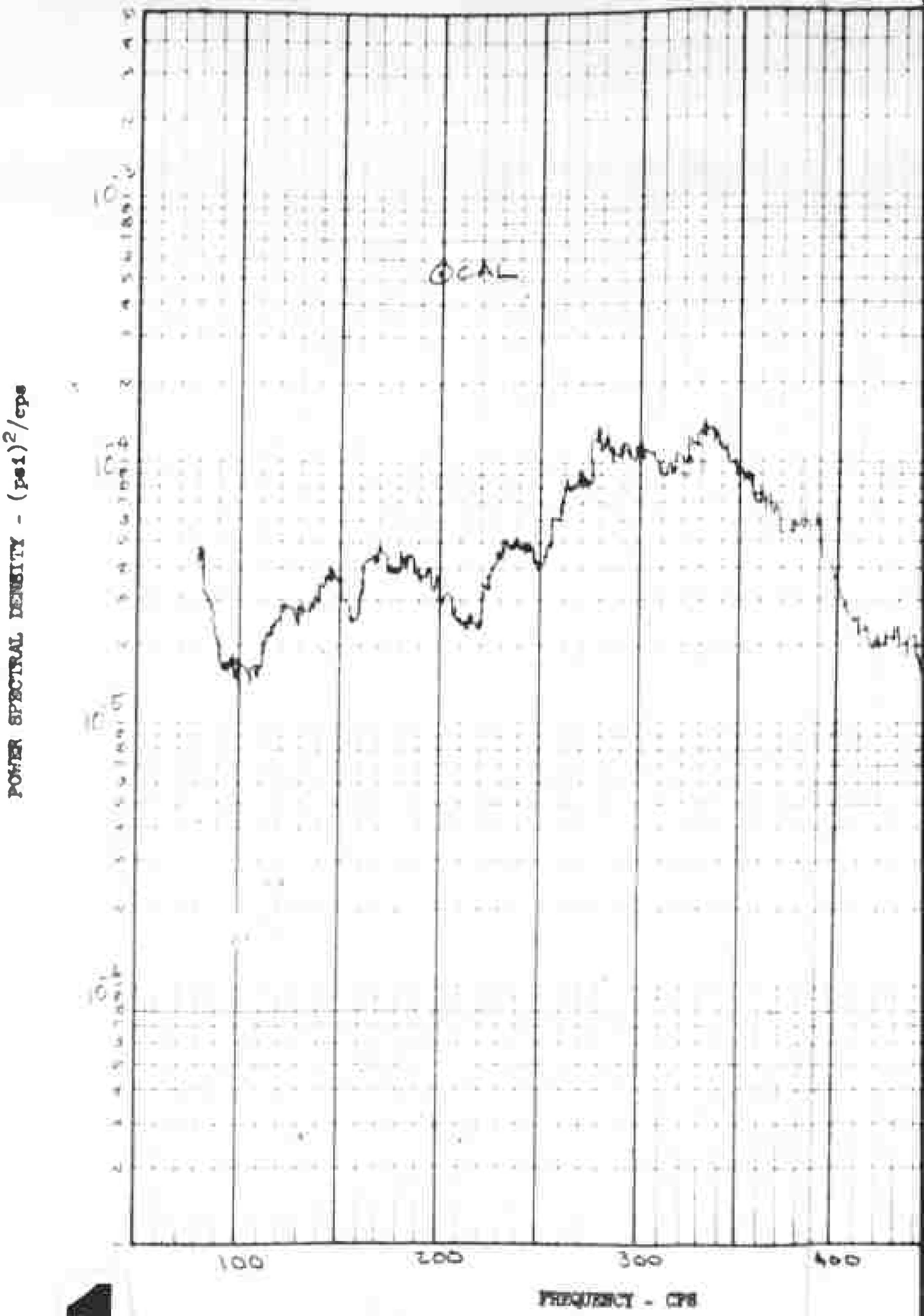
2

CALC	BT	6/21/[illegible]	REVISED	DATE
CHECK				
APR.				
APR.				

POWER SPECTRAL DENSITY ANALYSIS
OF DISPLACEMENT PICKUP
5 MIN TEST
P/U #6 PANEL 1497 PHASE A
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

PAGE FIG 1-2

2-5353-7-9

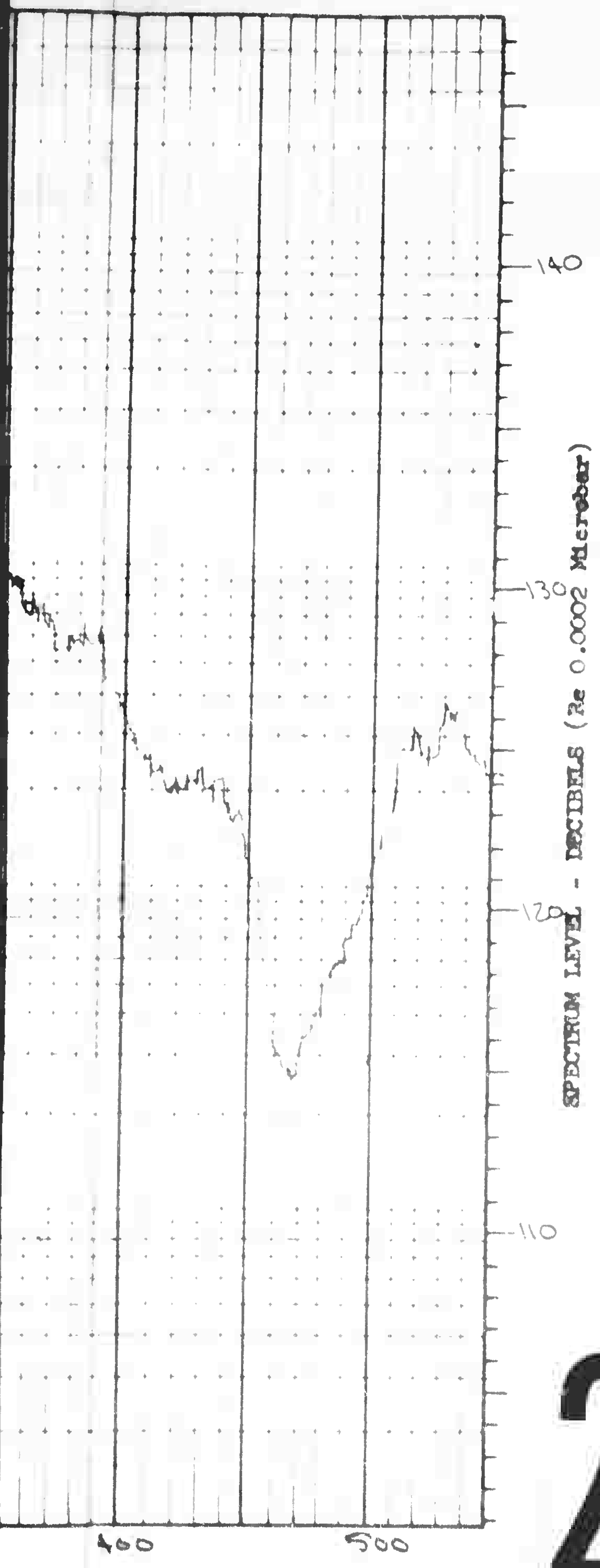


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_e 15 Sec.
___ cycles from ___ to ___ cps	Anal. Rate 333 cps/Sec.
___ cycles from ___ to ___ cps	Loop Length 15 Sec.



DATA IDENTIFICATION

Test Title: D S PANEL ATTACHMENT TYPE 1		
EWA No. 5-593	Panel or Specimen No. 1497	
Tape No. 57	Tape Channel 1	Mic. No. 1
Elapsed Test Time 60 MIN.	Mic. RMS Level at Sonic Lab. V_L = .700 Volts	

CALIBRATION

Tape No. 57	Tape Channel 6	Data Tape RMS Volt V_R = .134

Calibration Voltage
V_a = .50 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @700cps

Line Amplifier Settings
For Calibration G_c = 500; for Data G_d = 100

Lab. Gain LG = 1 | Tape Monitor Gain $TMG = \frac{G_d}{G_c} = .2$

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S = .145$

Equivalent of Calibration for PSD Plots

$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(.2)(1)}\right]^2 = .525 \quad psi^2/cps$$

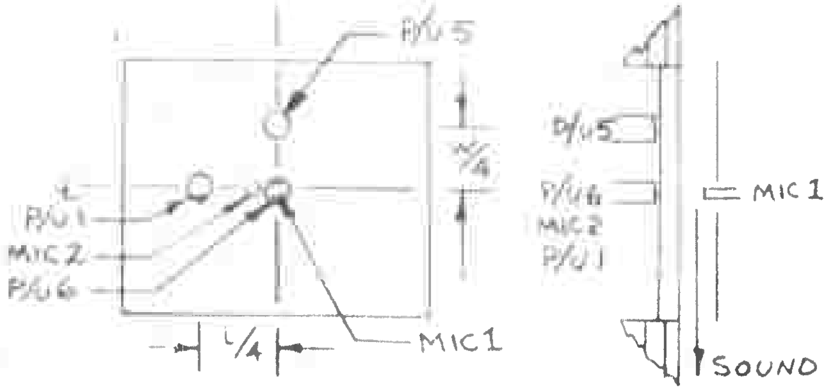
Analyzer Attenuator Setting -30 db | Log Converter Setting db

Calibration Plotted at 5.25×10^{-4} psi²/cps

Overall Pressure Level Data | Equiv. to 156.8 db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.134)}{(.2)(1)(.50)} = .1945 \quad psi$$

2



133 cps/Sec.
5 Sec.

6/23/61

GiC 6/21/61

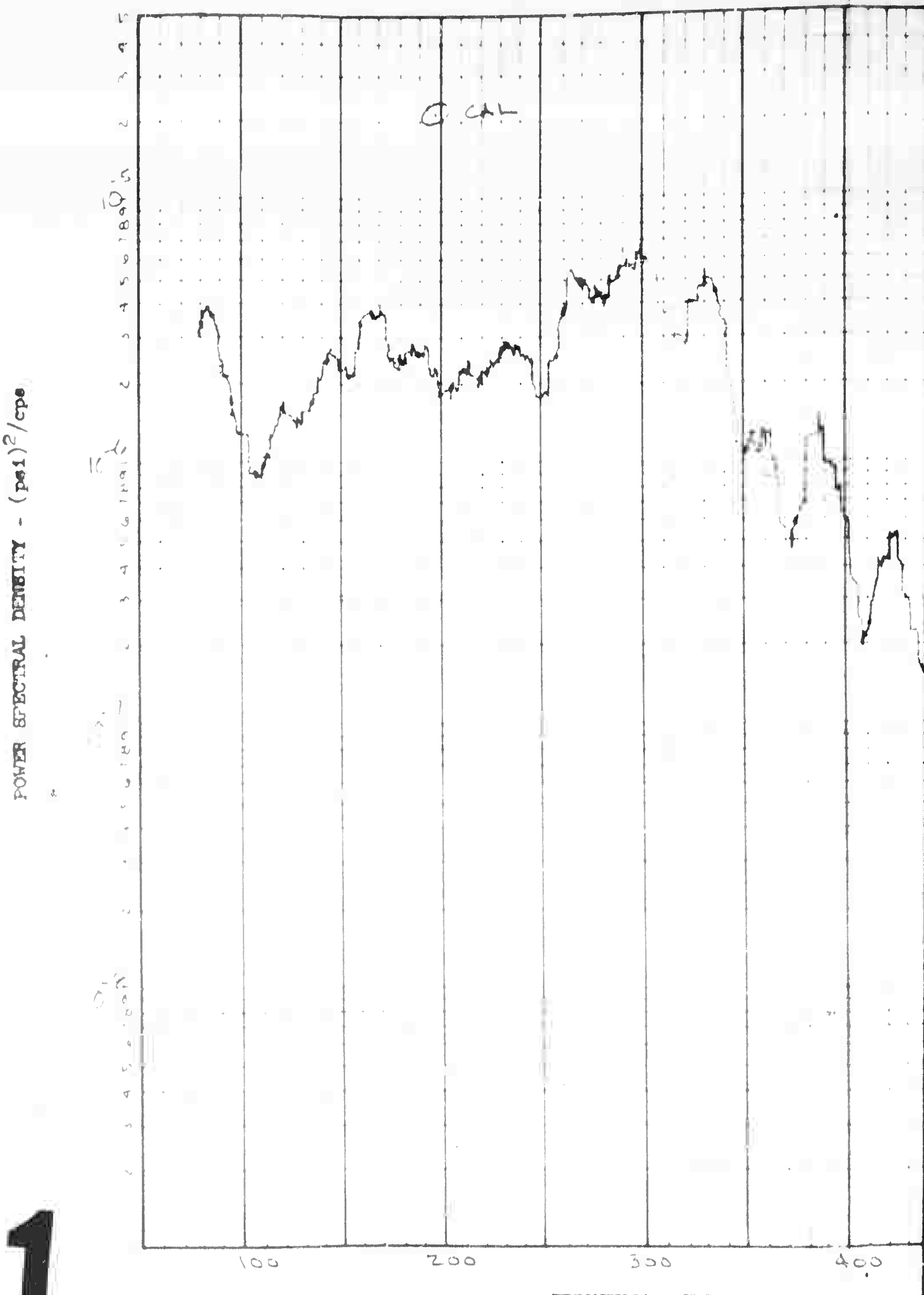
POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT

PANEL 1497 PHASE C

BOEING AIRPLANE COMPANY
SEATTLE, WASHINGTON

D2 30084

PAGE FIG 193

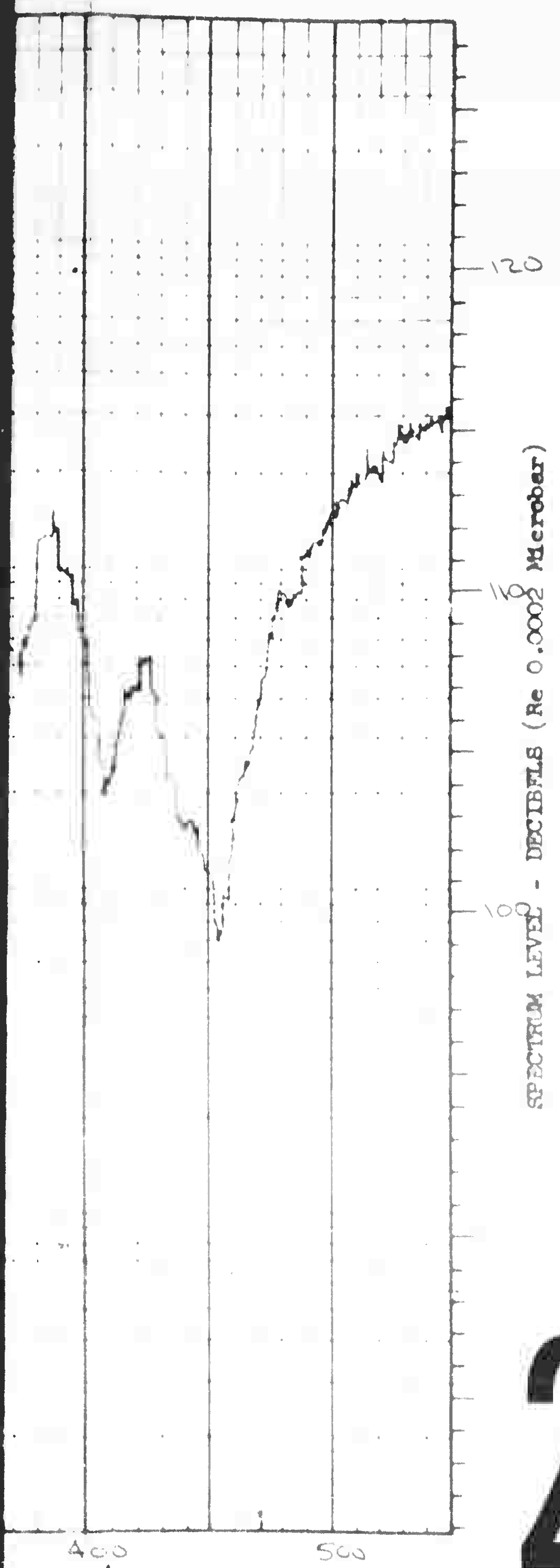


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps		T_c 15 Sec.
___ cycles from ___ to ___ cps		Anal. Rate .333 cps/Sec.
___ cycles from ___ to ___ cps		Loop Length 15 Sec.



DATA IDENTIFICATION

Test Title: D.S. PANEL ATTACHMENT - TYPE 1		
EWA No. 5-593	Panel or Specimen No. 1497	
Tape No. 57	Tape Channel 2	Mic. No. 2
Elapsed Test Time +60 MIN.	Mic. RMS Level at Sonic Lab. V_L = .145 Volts	

CALIBRATION

Tape No. 57	Tape Channel 6	Data Tape RMS Volt V_R = .147

Calibration Voltage
V_a = .50 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @ 20 cps

Line Amplifier Settings
For Calibration G_c = 500 ; for Data G_d = 500

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

Equivalent of Calibration for PSD Plots
$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(1)(1)}\right]^2 = .021$ psi^2/cps

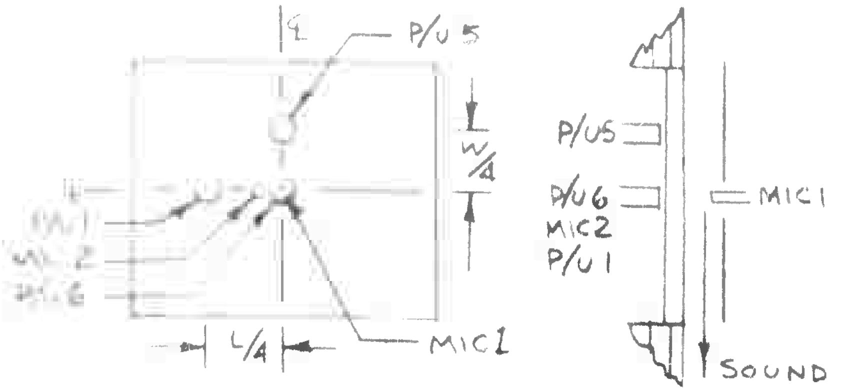
Analyzer Attenuator Setting -30 db	Log Converter Setting db

Calibration Plotted at 2.1×10^{-5} psi^2/cps

Overall Pressure Level Data	Equiv. to 143.4 db SPL

RMS pressure level $= \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.147)}{(1)(1)(.50)} = .0427$ psi

2



cps/Sec.
Sec.

POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT

PANEL 1497 PHASE C

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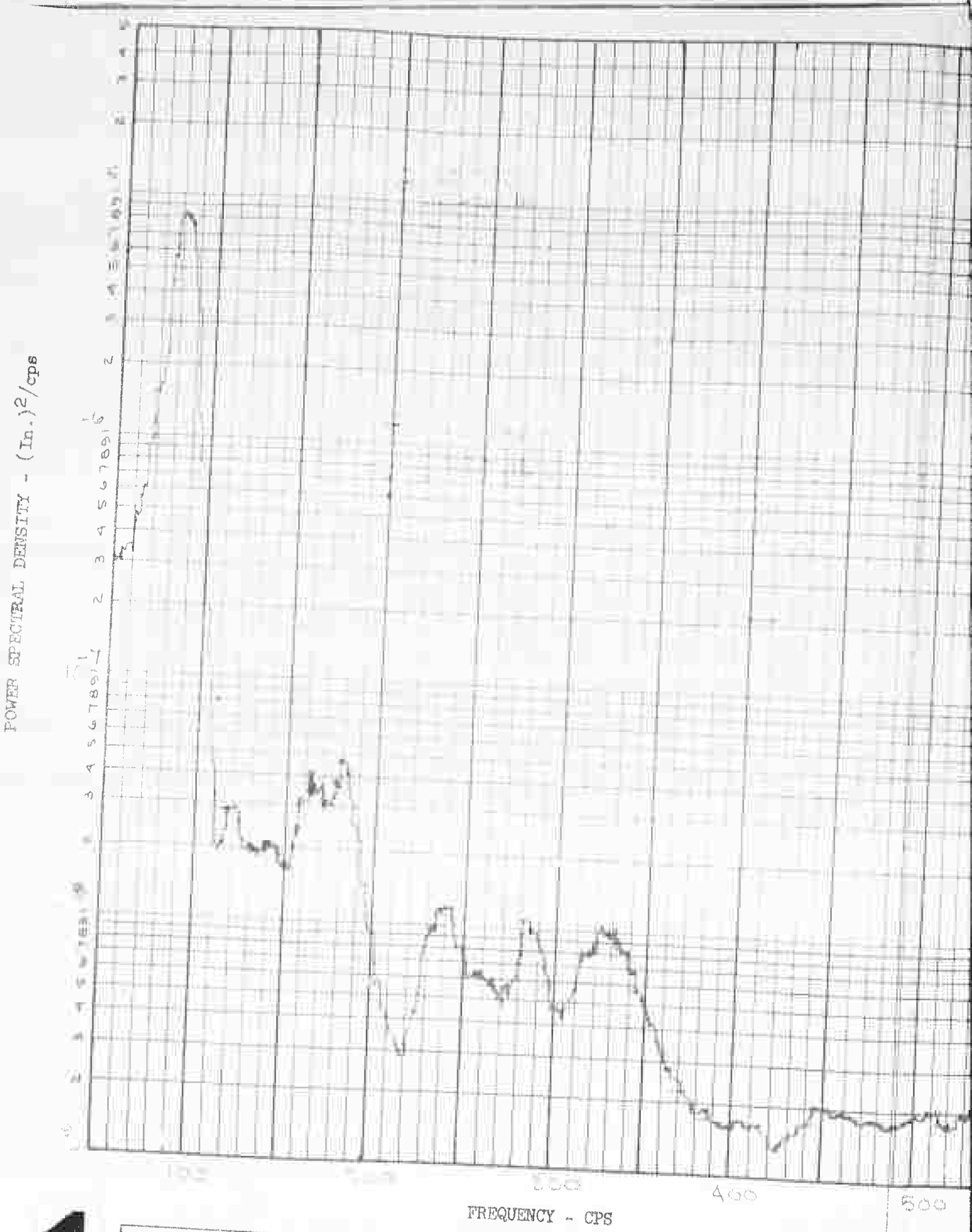
BOEING AIRPLANE COMPANY
SEATTLE, WASHINGTON

PAGE
FIG 194



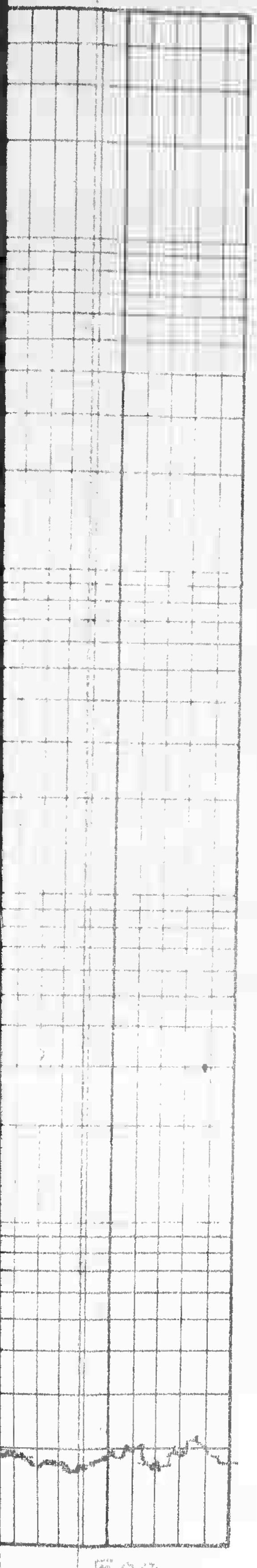
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps		T_c 15 Sec.	
___ cycles from ___ to ___ cps		Anal. Rate .333 cps/sec.	
___ cycles from ___ to ___ cps		Loop Length 15 Sec.	

CALC	MHM
CHECK	C BT
APR.	
APR	



DATA IDENTIFICATION

Test Title D.S. PANEL ATTACHMENT – TYPE I		
EWA No. 5-593	Panel or Specimen No. 1437	
Tape No. 57	Tape Channel 3	Displacement Pickup # 1
Elapsed Test Time 60 MIN.	P/U RMS Level at Sonic Lab. V_L = .265 Volts	

CALIBRATION

Tape No. 57	Tape Channel 6	Data Tape RMS Volt V_R = 165

Calibration Voltage
V_a = .50 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = 500 ; for Data G_d = 250

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .5

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{.5 \times 1}\right]^2$ = [illegible] in.^{2}/cps

Analyzer Attenuator Setting −20 −60 db [illegible] Log Converter Setting 0 db

Calibration Plotted at
1.25 (10^{-4}) in.^{2}/cps

Overall Deflection Level of Data

RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] in.

CALC	[illegible]	6-[illegible]	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 3.5 MIN TEST 151.5 db P/U #1 PANEL 1437 PHASE C BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
CHECK	C.B.T.	6/[illegible]			
APR.					
APR					

[illegible]
D2-[illegible]
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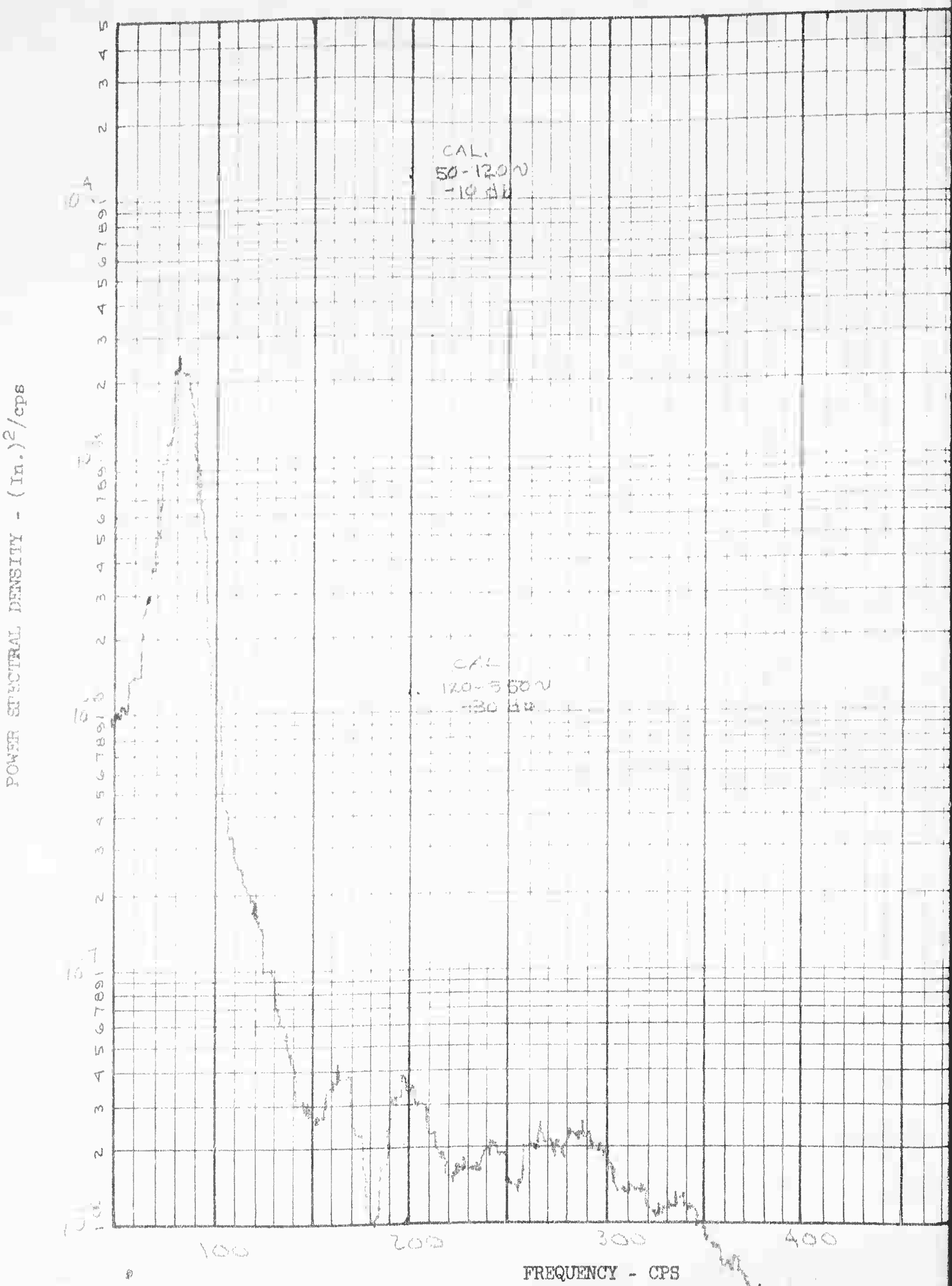
2



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps — T_c 15 Sec.

___ cycles from ___ to ___ cps — Anal. Rate .333 cps/sec.

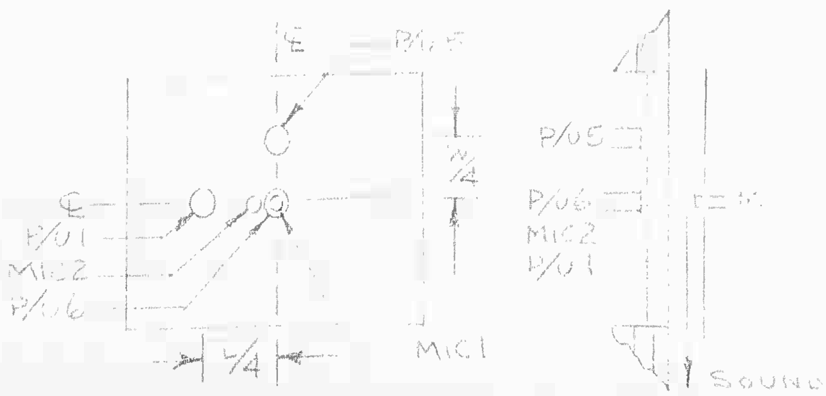
___ cycles from ___ to ___ cps — Loop Length 15 Sec.

DATA IDENTIFICATION

Test Title D.S. PANEL ATTACHMENT -TYPE 1		
EWA No. 5-693	Panel or Specimen No. 1497	
Tape No. 57	Tape Channel 4	Displacement Pickup # 5
Elapsed Test Time 60 MIN.	P/U RMS Level at Sonic Lab. V_L = .560 Volts	

CALIBRATION

Tape No. 57	Tape Channel 6	Data Tape RMS Volt V_R = .290
Calibration Voltage V_a = .50 V_{rms} into Line Amp.; V_c = [illegible] V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = 500; for Data G_d = 250		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .5	
Displacement Pickup Sensitivity S = .0354 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .0177		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(.5)(1)}\right]^2$ = 1.25 [illegible] in.^{2}/cps		
Analyzer Attenuator Setting db	Log Converter Setting db	
Calibration Plotted at 1.25 x 10^{-4} [illegible] [illegible] x 10^{-6} [illegible] in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] in.		



500

2

CALC	CBT	6/29/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP
CHECK					0.5 MIN TEST 157.5 db
APR.					P/U #5 PANEL 1497 [illegible]
APR.					BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON

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PAGE Fig 196

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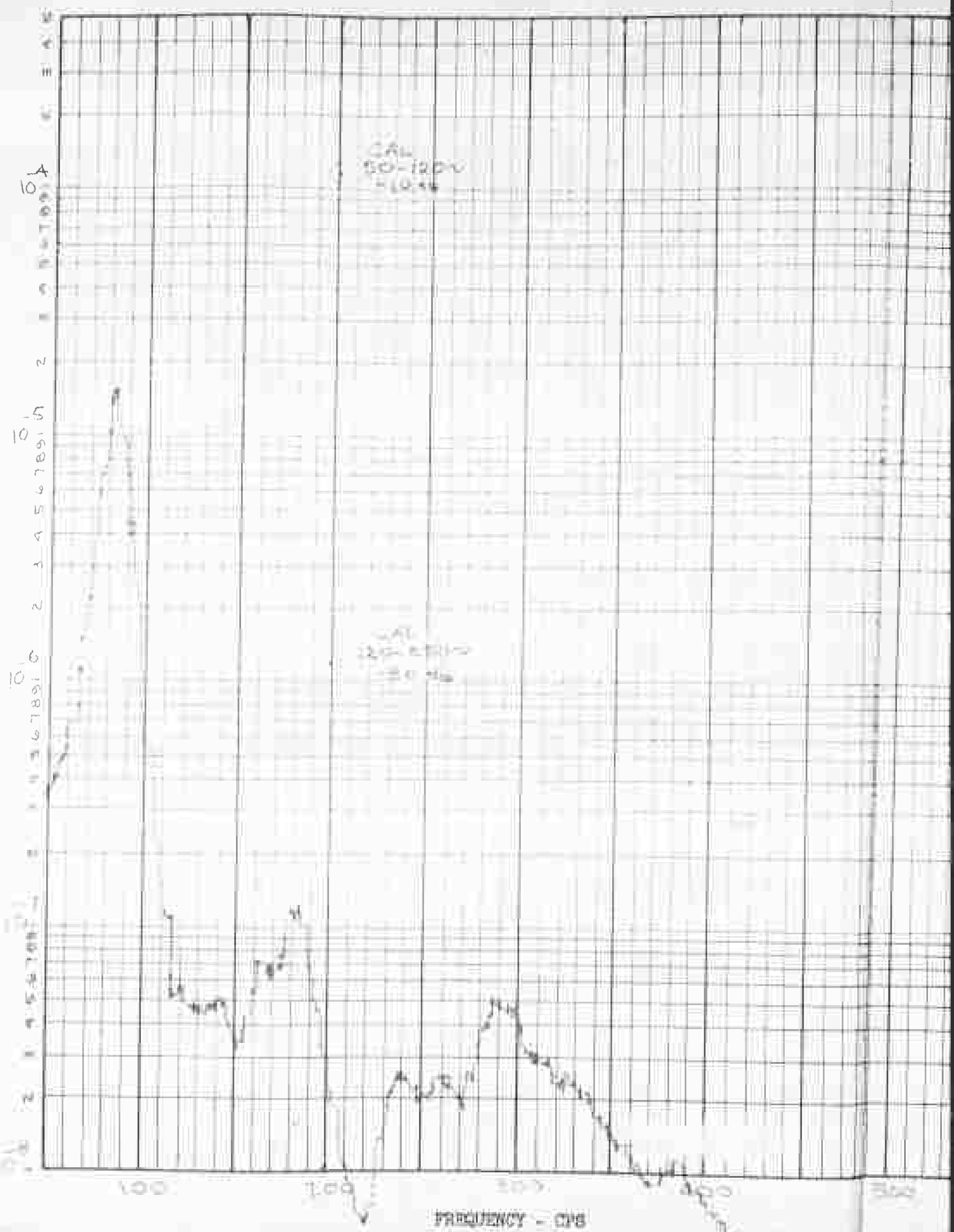


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 15 Sec.

___ cycles from ___ to ___ cps   Anal. Rate .333 cps/sec.

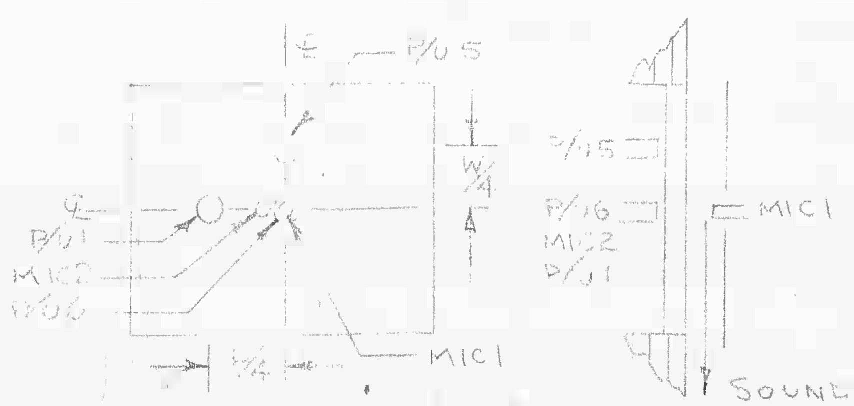
___ cycles from ___ to ___ cps   Loop Length 15 Sec.

DATA IDENTIFICATION

Test Title D.S. PANEL ATTACHMENT - TYPE I		
EWA No. 3-593	Panel or Specimen No. 1497	
Tape No. 57	Tape Channel 5	Displacement Pickup # 6
Elapsed Test Time 60 MIN.	P/U RMS Level at Sonic Lab. V_L = 4.80 Volts	

CALIBRATION

Tape No. 57	Tape Channel 6	Data Tape RMS Volt V_R = .230
Calibration Voltage V_a = .50 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = 500; for Data G_d = 250		
Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .5	
Displacement Pickup Sensitivity S = .0354 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .0177		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{.0177}{(.5)(1)}\right)^2 = 1.25 \times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting 50-1200 −10 db 1200-5000 −30 db	Log Converter Setting db	
Calibration Plotted at 1.25 × 10⁻⁴ 50-1200 1.25 (10⁻⁶) 1200-5000 in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{.0177(.23)}{.5(1)(.5)}$ = .0163 in.		



500

CALC	CBT	6/29/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 0.5 MIN TEST 157.5db P/U #6 PANEL 1497 PHASE 5 BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	Vol. I
CHECK						D2-8064
APR.						PAGE
APR.						FIG 187

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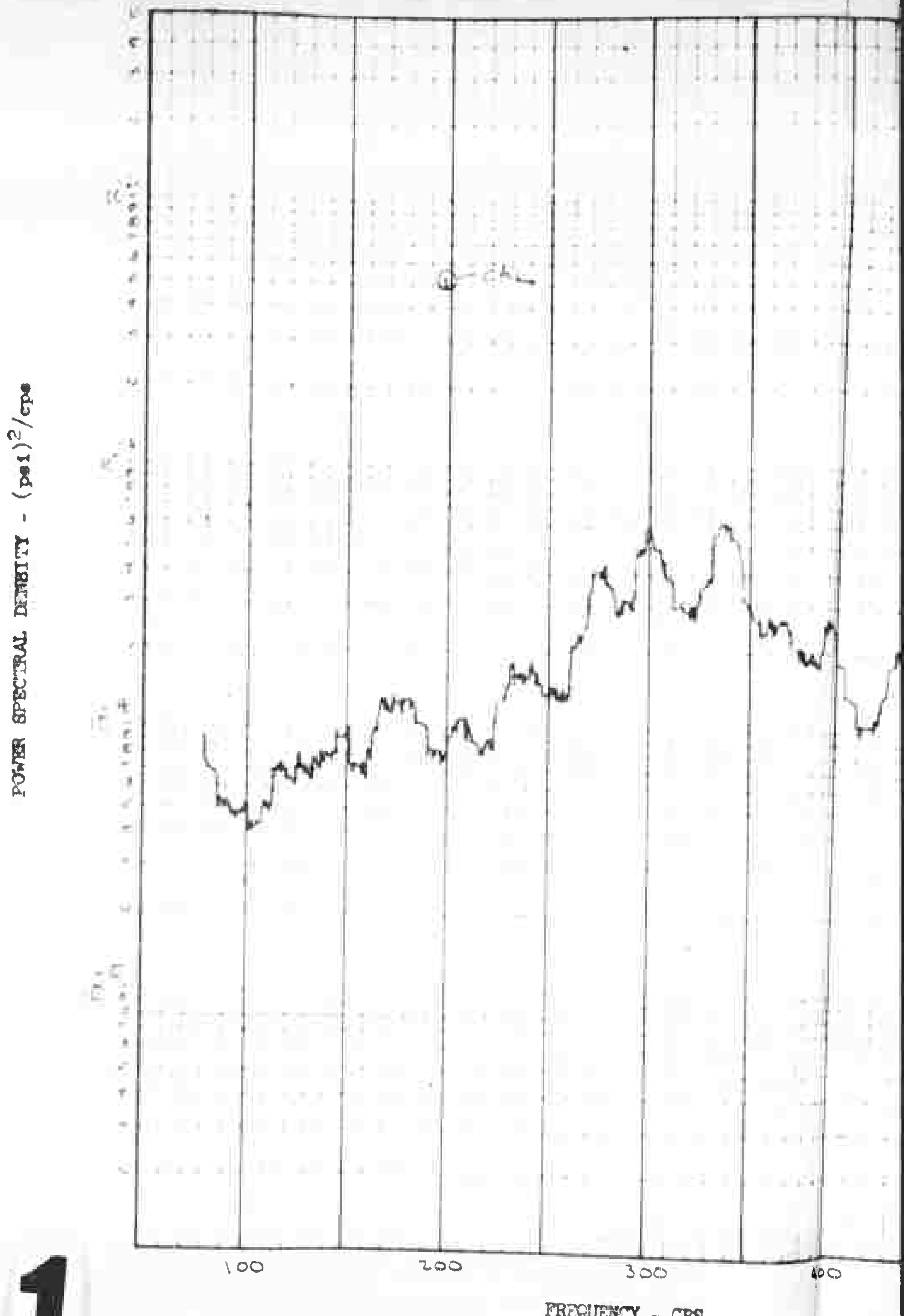
2

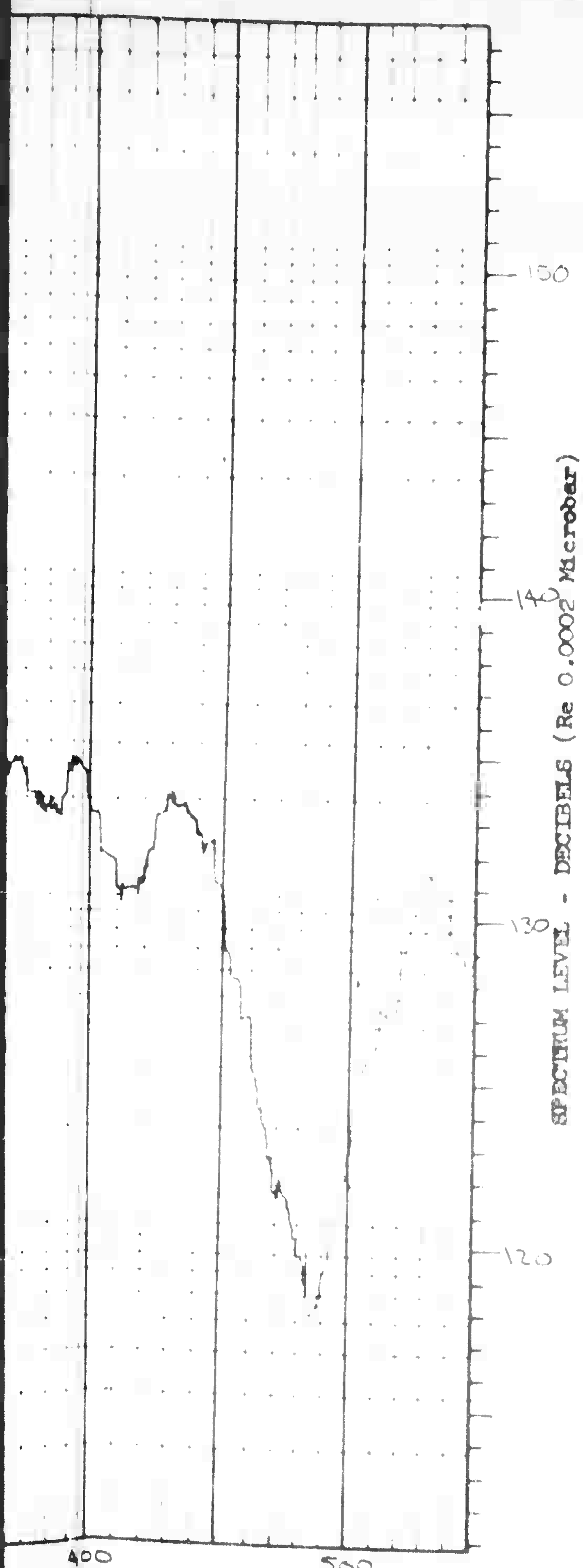


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 15 Sec.
____ cycles from ____ to ____ cps Anal. Rate .333 cps/Sec.
____ cycles from ____ to ____ cps Loop Length 15 Sec.



DATA IDENTIFICATION

Test Title: D.S PANEL ATTACHMENT - TYPE I	
EWA No.: 5593	Panel or Specimen No.: 1497
Tape No.: 58	Tape Channel: 1
Mic. No.: 1	
Elapsed Test Time: 60.5 MIN.	Mic. RMS Level at Sonic Lab. V_L = 1.27 Volts

CALIBRATION

Tape No.: 58	Tape Channel: 6
Data Tape RMS Volt V_R = .230	

Calibration Voltage
V_a = .50V_{rms} into Line Amp.; V_c = .50V_{rms} on Tape @200cps

Line Amplifier Settings
For Calibration G_c = 500 ; for Data G_d = 100

Lab. Gain
LG = 1

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .2

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

Equivalent of Calibration for PSD Plots

$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(.2)(1)}\right]^2 = .525 \text{ psi}^2/\text{cps}$$

Analyzer Attenuator Setting db

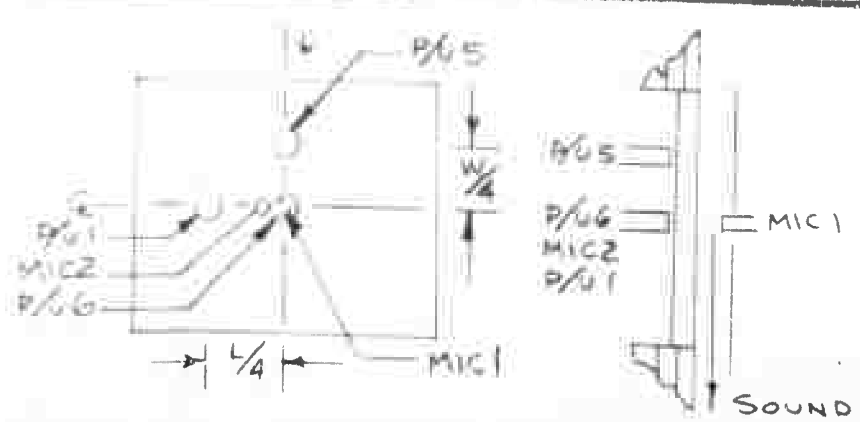
Log Converter Setting 0 db

Calibration Plotted at 10^{-3} psi²/cps

Overall Pressure Level Data

Equiv. to 161.3 db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.230)}{(.2)(1)(.50)} = .334 \text{ psi}$$



2

3 cps/Sec.
Sec.

-38
6/29/61
6/23/61

6/3/61

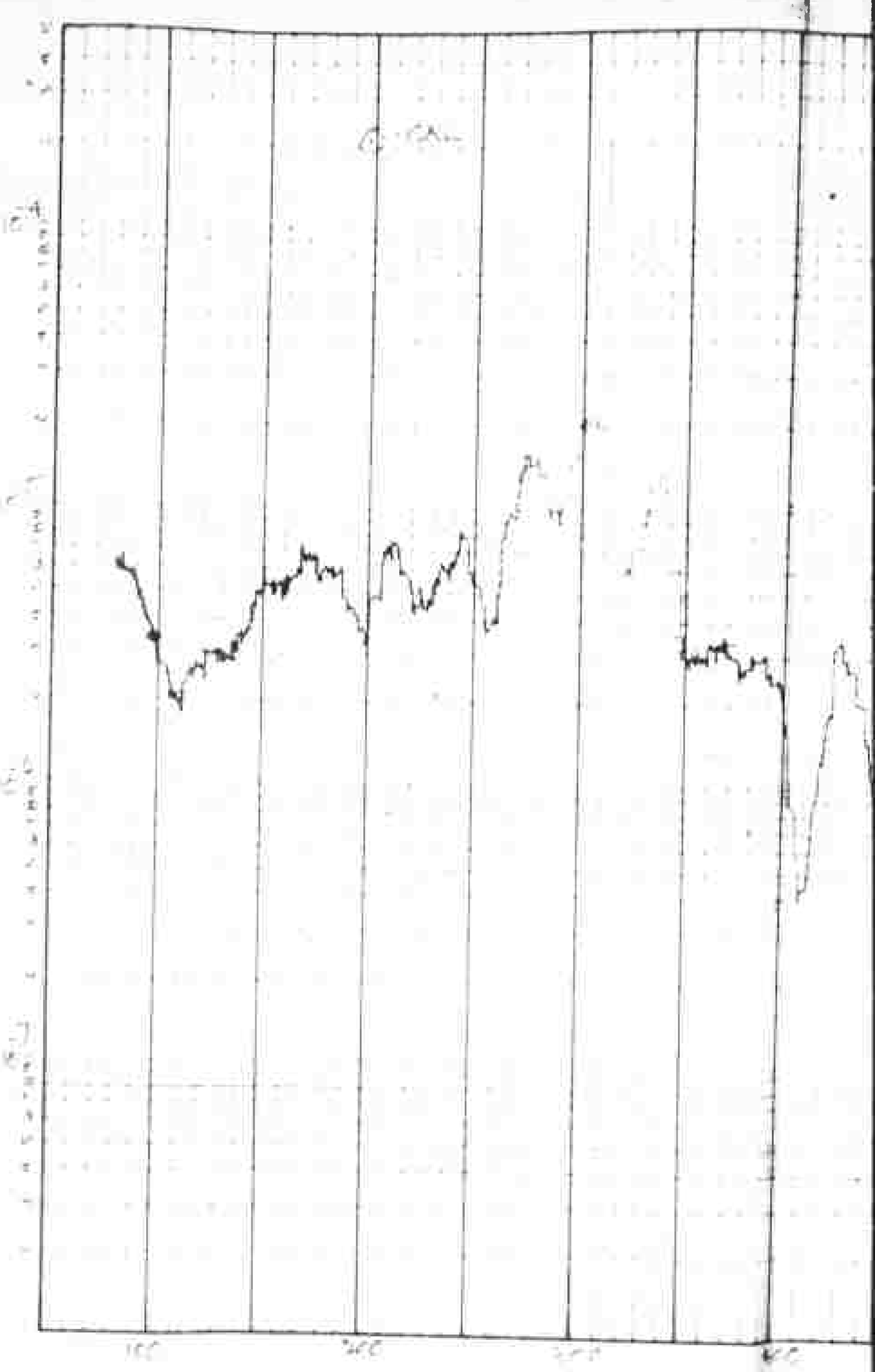
POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT

PANEL 1497 PHASE D

BOEING AIRPLANE COMPANY
SEATTLE, WASHINGTON

D2 80084

PAGE
FIG 198



POWER SPECTRAL DENSITY - $(psi)^2/cps$

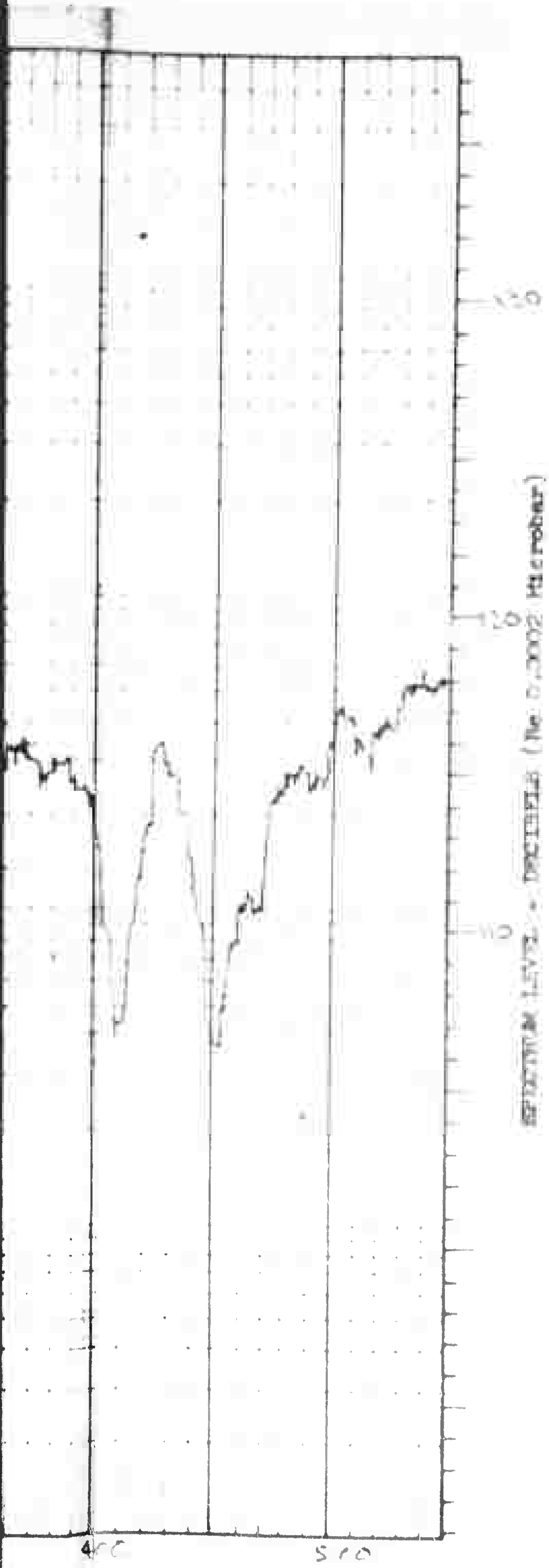
FREQUENCY - CPS

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 15 Sec.
___ cycles from ___ to ___ cps	Anal. Rate 133 cps/Sec.
___ cycles from ___ to ___ cps	Loop Length 15 Sec.

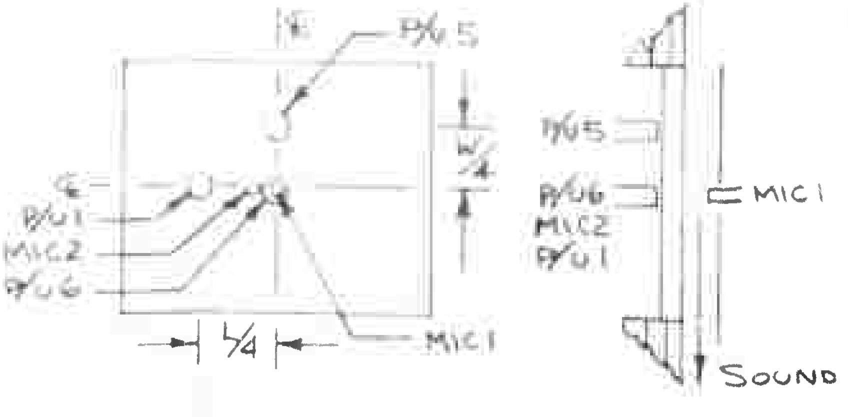


DATA IDENTIFICATION

Test Title D.C. PANEL ATTACHMENT - TYPE I		
EWA No. 5393	Panel or Specimen No. 1497	
Tape No. 58	Tape Channel 2	Mic. No. 2
Elapsed Test Time 66.5 MIN	Mic. RMS Level at Sonic Lab. V_L = .225 Volts	

CALIBRATION

Tape No. 58	Tape Channel 6	Data Tape RMS Volt V_R = .215
Calibration Voltage V_a = .500 V_{rms} into Line Amp.; V_e = .500 V_{rms} on Tape @ [illegible] cps		
Line Amplifier Settings For Calibration G_c = 500; for Data G_d = 500		
Lab. Gain LC = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = (.5)(.290) = .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LC)}\right)^2$ = (.145)^2 = .021 psi^2/cps		
Analyzer Attenuator Setting -30 db	Log Converter Setting 0 db	
Calibration Plotted at 2.1×10^{-4} psi^2/cps		
Overall Pressure Level Data	Equiv. to 146.6 db SPL	
RMS pressure level = $\frac{(P_c)(V_R)}{(TMG)(LC)(V_e)} = \frac{(.145)(.215)}{(1)(1)(.5)}$ = .0624 psi		



2

CBT 6/22/61
DJ 6/22/61
LK 6/21/61

cps/Sec.
Sec.

POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT

PANEL 1497 PHASE D

BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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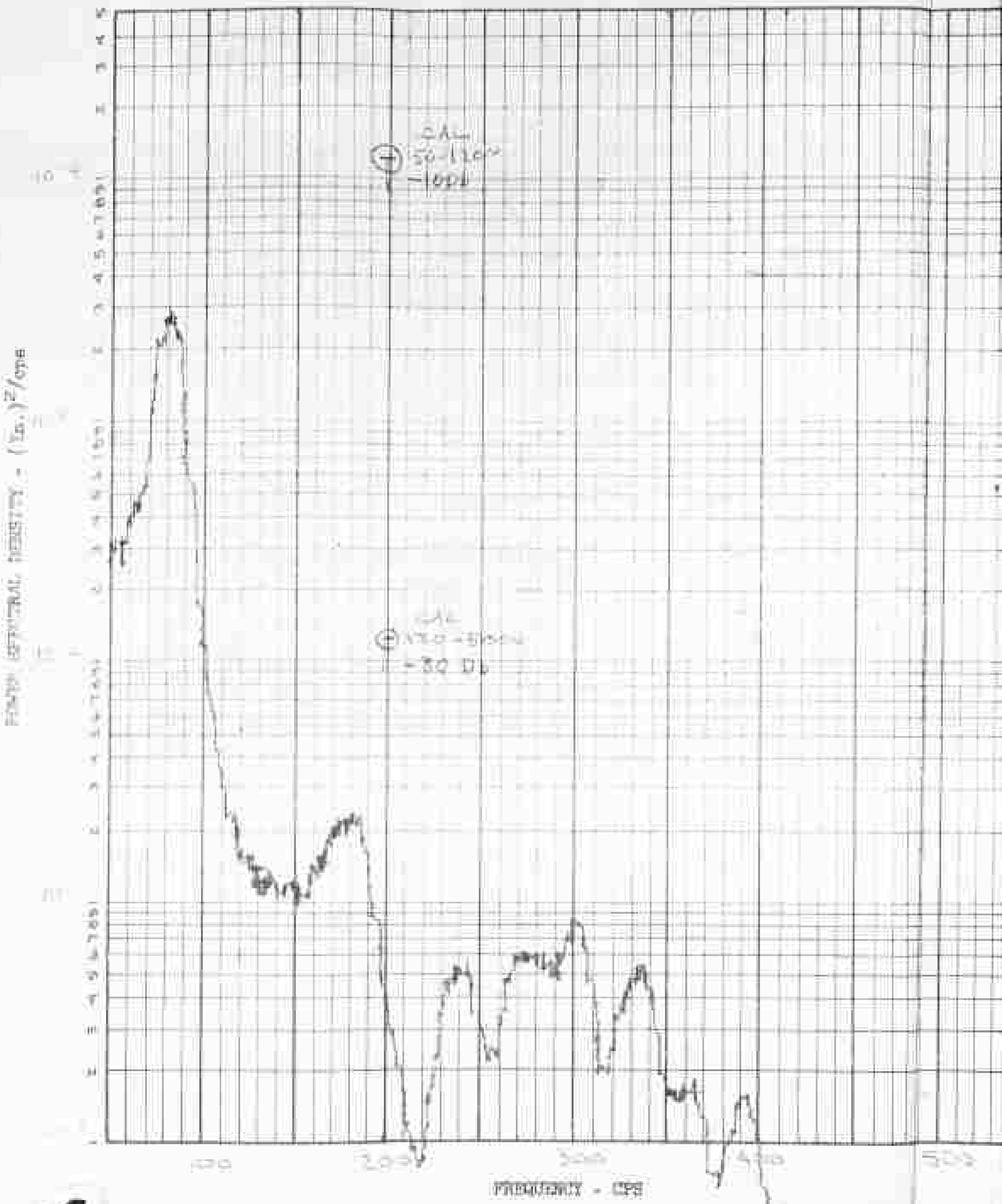
PAGE
FIG 199



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps — T_e ____ Sec.

____ cycles from ____ to ____ cps — Anal. Rate ____ cps/sec.

____ cycles from ____ to ____ cps — Loop Length ____ Sec.

CALC

CHECK

APP

APP

DATA IDENTIFICATION

Test Title DS PANEL ATTACHMENT - TYPE 1	
EWA No. 5-593	Panel or Specimen No. 1437
Tape No. 58 / Tape Channel 3	Displacement Pickup # 1
Elapsed Test Time 0.5 MIN	P/U RMS Level at Sonic Lab. V_L = ___ Volts

CALIBRATION

Tape No. 58	Tape Channel 6	Data Tape RMS Volt V_R =

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = 500 ; for Data G_d = 250

Lab. Gain LG = 1 | Tape Monitor Gain $TMG = \frac{G_d}{G_c} = .5$

Displacement Pickup Sensitivity
S = 0.054 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S = .0177$

Equivalent of Calibration for PSD Plots

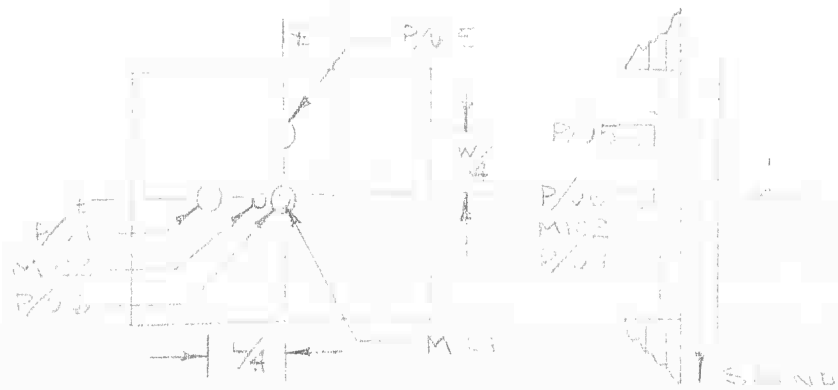
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{.5}\right]^2 = 1.26 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting [illegible] db | Log Converter Setting db

Calibration Plotted at 1.26 [illegible] in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMC)(LG)(V_c)} = \frac{(.0177)(.40)}{(.5)(1)(.5)} = .0[illegible] \text{ in.}$$



500

CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 0.5 MIN TEST 162 db P/U #1 PANEL 1437 PHASE D	VOL. I
CHECK	CBT	4/27/61				D2-8084
APR.					BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	PAGE 56 200
APR						

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2

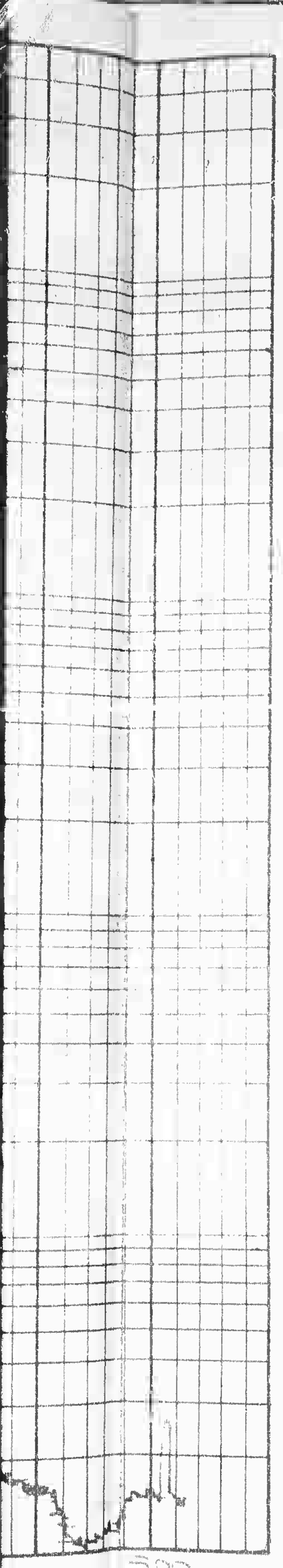
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 15 Sec.
___ cycles from ___ to ___ cps	Anal. Rate .333 cps/sec.
___ cycles from ___ to ___ cps	Loop Length 15 Sec.

CALC.	
CHECK	CBT
APR.	
APR.	



DATA IDENTIFICATION

Test Title: O.S. PANEL ATTACHMENT - TYPE I	
EWA No.: S-593	Panel or Specimen No.: 1497

Tape No.: 58	Tape Channel: 4	Displacement Pickup #: 5

Elapsed Test Time: 60.5 MIN	P/U RMS Level at Sonic Lab. V_L = —— Volts

CALIBRATION

Tape No.: 58	Tape Channel: 6	Data Tape RMS Volt V_R = 16

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ [illegible] cps

Line Amplifier Settings
For Calibration G_c = 500; for Data G_d = 100

Lab. Gain LG = 1	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .2

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

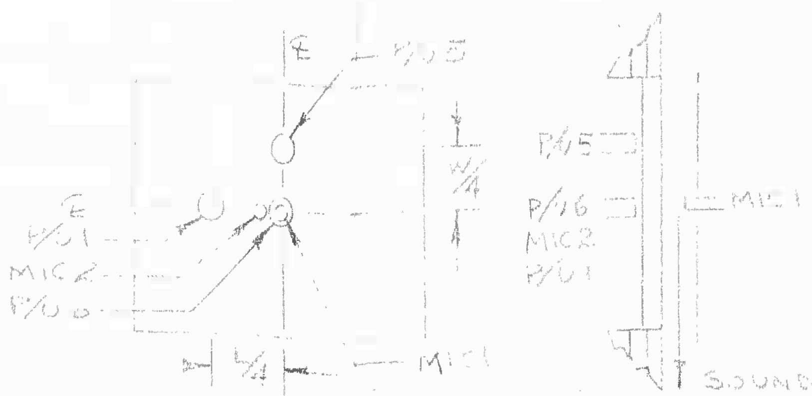
Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(.2)(1)}\right]^2 = 7.83 \times 10^{-3} \text{ in.}^2\text{/cps}$$

Analyzer Attenuator Setting -20 db @ 50-1300 ; -30 db @ [illegible]-5500 db	Log Converter Setting db

Calibration Plotted at 7.82 (10^{-5}) 50-1300 ; 7.82 (10^{-6}) [illegible] in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = [illegible] = .0288 \text{ in.}$$



CALC.	[illegible]	6-22	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP	VOL I
CHECK	CBT	6/23/61			0.5 MIN TEST 162 db	D2-8008A
APR.					P/U #5 PANEL 1497 PHASE "D"	PAGE
APR.					BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	FIG 201

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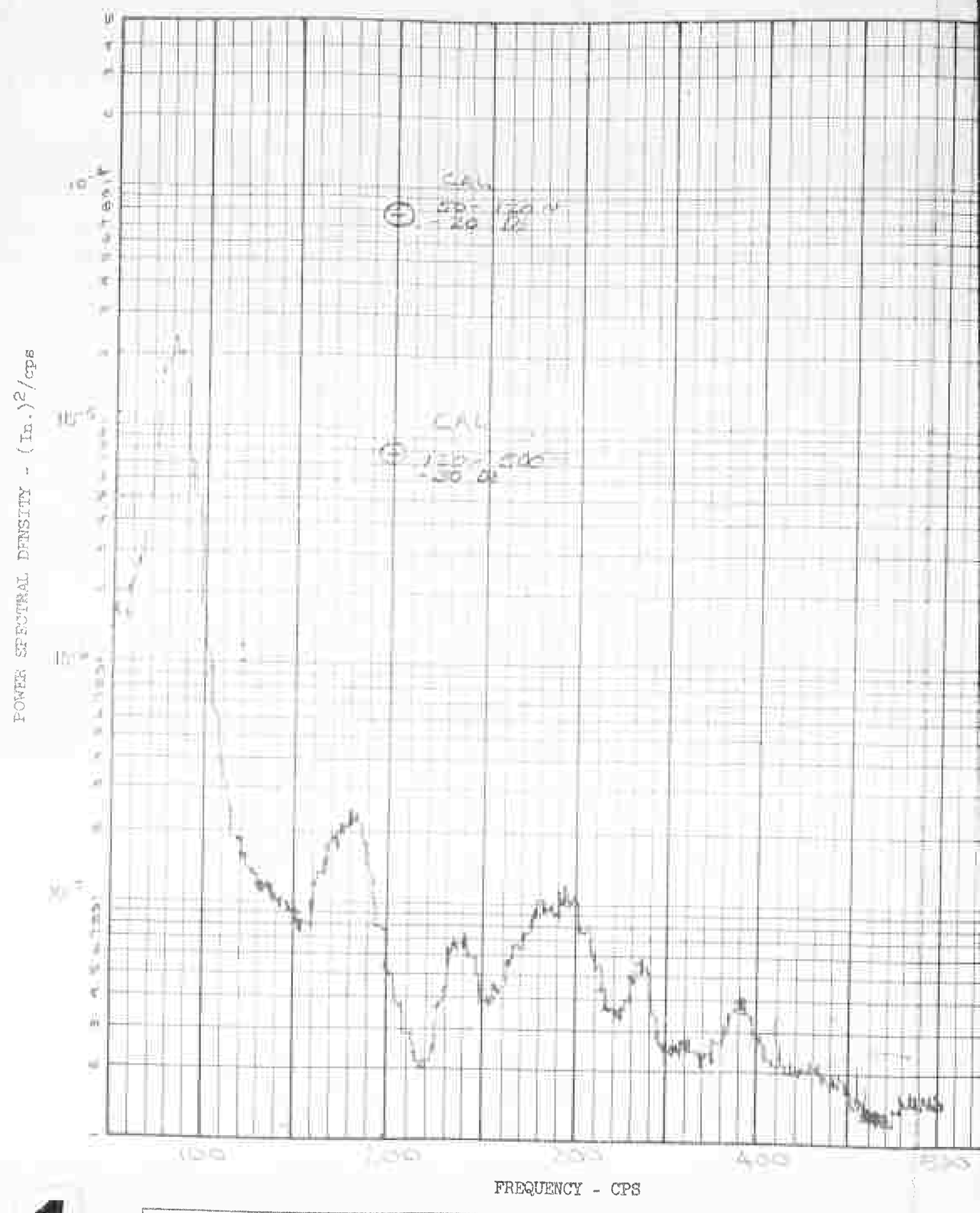
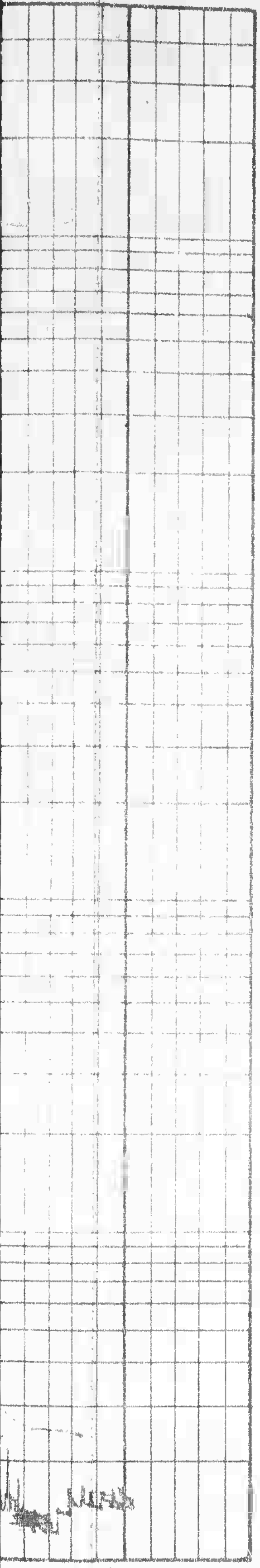
2



1

ANALYSIS VARIABLES					
Bandwidth					
5 cycles from 50 to 500 cps			T_c 15 Sec.		
___ cycles from ___ to ___ cps			Anal. Rate .333 cps/sec.		
___ cycles from ___ to ___ cps			Loop Length 15 Sec.		

CALC	
CHECK	CBT
APR	
APR	



DATA IDENTIFICATION

Test Title D.S. PANEL ATTACHMENT -TYPE I		
EWA No. 5-593	Panel or Specimen No. 1497	
Tape No. 58	Tape Channel 5	Displacement Pickup # 6
Elapsed Test Time 60.5 MIN.	P/U RMS Level at Sonic Lab. V_L = —— Volts	

CALIBRATION

Tape No. 58	Tape Channel 6	Data Tape RMS Volt V_R = .118

Calibration Voltage
V_a = .50 V_{rms} into Line Amp.; V_c = .50 V_{rms} on Tape @ [illegible] cps

Line Amplifier Settings
For Calibration G_c = [illegible]; for Data G_d = 100

Lab. Gain
LG = 1

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .2

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

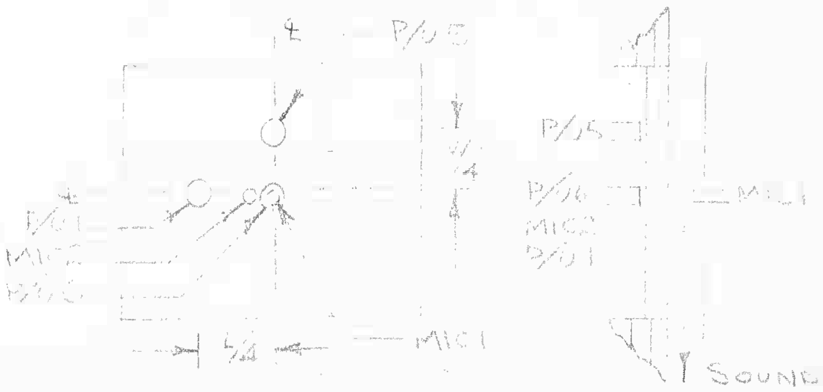
Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{.2(1)}\right]^2 = 7.83 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting −20 (50-120), −30 (130-500) db; Log Converter Setting 0 db

Calibration Plotted at 7.83 (10^{-3}) in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{.0177\,(.118)}{.2\,(1)\,(.5)} = .0209 \text{ in.}$$



CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 0.5 MIN TEST 62.5 P/U #6 PANEL 1497 PHASE I BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I D2-9084
CHECK	CBT	6/29/61				
APR.						PAGE FIG 262
APR						

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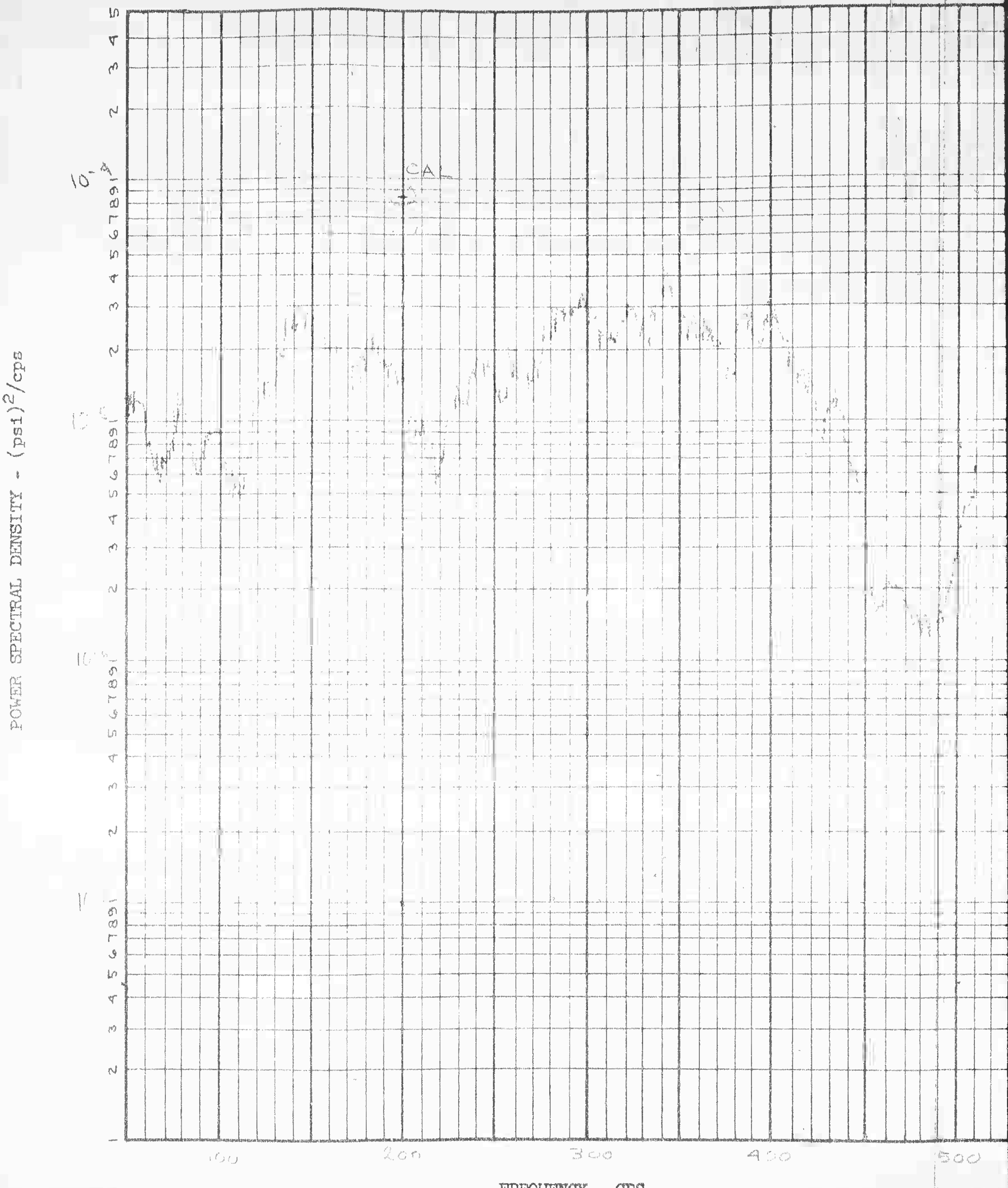


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 4 Sec.
___ cycles from ___ to ___ cps   Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps   Loop Length 4 Sec.

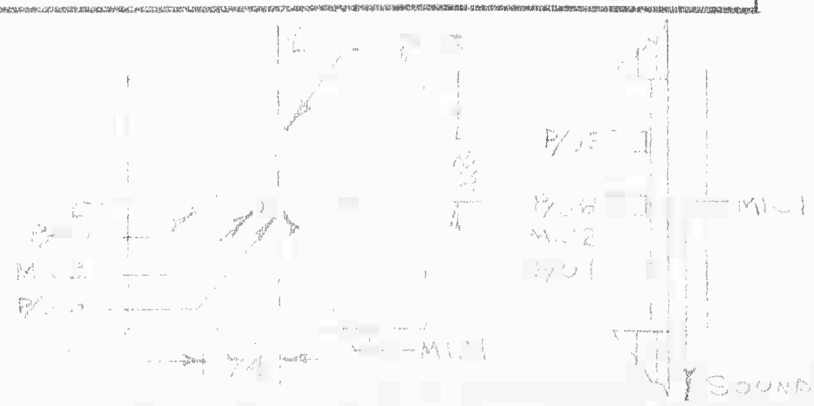
CALC	[illegible]
CHECK	JOA
APR.	
APR.	

DATA IDENTIFICATION

Test Title PANEL ATTACH, TYPE I PRELIM		
EWA No. 5-593	Panel or Specimen No. 1498	
Tape No. 27	Tape Channel 1	Mic. No. 1
Elapsed Test Time +5	Mic. RMS Level at Sonic Lab. V_L = .410 Volts	

CALIBRATION

Tape No. 27	Tape Channel 6	Data Tape RMS Volt V_R = .196
Calibration Voltage V_a = 5 V_{rms} into Line Amp.; V_c = .52 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .500 ; for Data G_d = .250		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .5	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left(\frac{.145}{(.5)(1)}\right)^2$ = 8.41(10⁻²) psi²/cps		
Analyzer Attenuator Setting -30 db	Log Converter Setting 0 db	
Calibration Plotted at 8.41(10⁻²) psi²/cps		
Overall Pressure Level Data	Equiv. to 151.6 db SPL	
RMS pressure level $= \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.196)}{(.5)(1)(.52)}$ = .110 psi		



CALC			REVISED	DATE
CHECK	JOA	6/7/61		
APR.				
APR				

POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT
5 MIN TEST
MIC 1 PANEL 1498 PHASE A
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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PAGE
FIG 263

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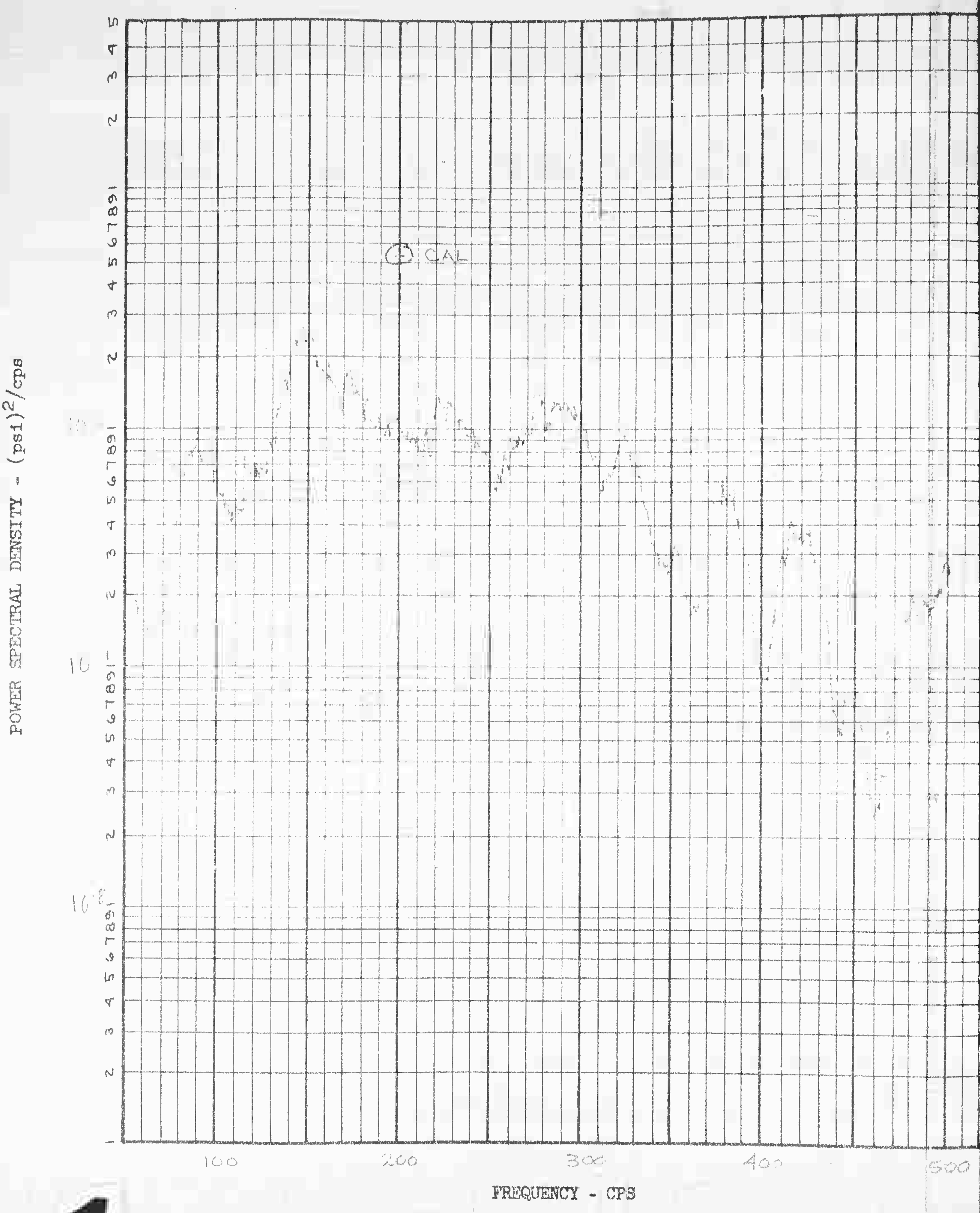
2



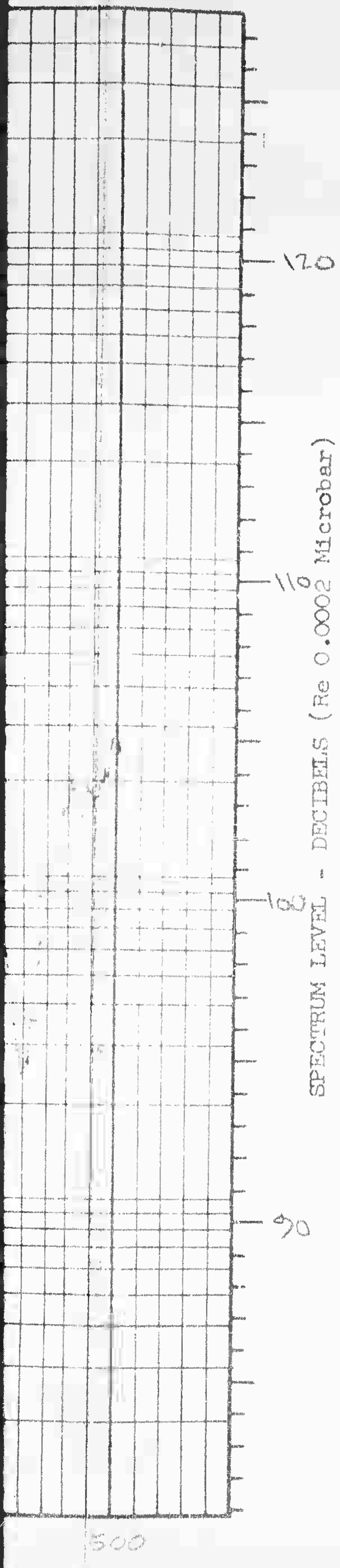
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 4 Sec.
___ cycles from ___ to ___ cps   Anal. Rate 1.25 cps/Sec.
___ cycles from ___ to ___ cps   Loop Length 4 Sec.

CALC	
CHECK	DOA
APR.	
APR.	



DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM.		
EWA No. S-593	Panel or Specimen No. 1498	
Tape No. 27	Tape Channel 2	Mic. No. 2
Elapsed Test Time +5	Mic. RMS Level at Sonic Lab. V_L = .090 Volts	

CALIBRATION

Tape No. 27	Tape Channel 6	Data Tape RMS Volt V_R = .180

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .52 V_{rms} on Tape @200cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = 1.000

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2.0

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

Equivalent of Calibration for PSD Plots

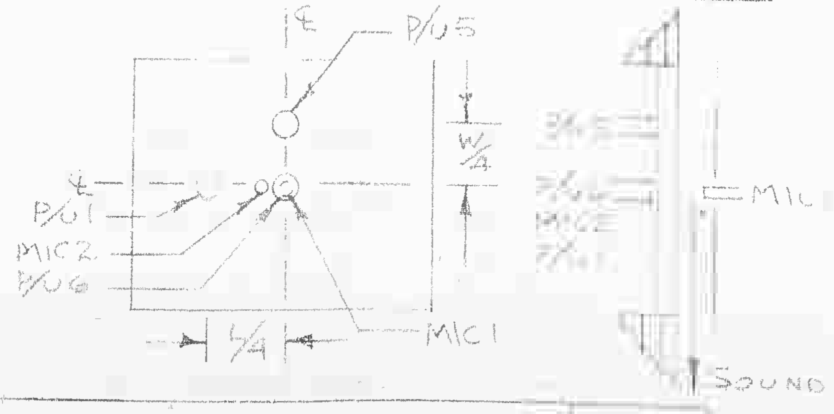
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(2)(1)}\right]^2 = 5.25(10^{-3}) \quad psi^2/cps$$

Analyzer Attenuator Setting -10 db	Log Converter Setting 0 db

Calibration Plotted at 5.25 (10^{-3}) psi^2/cps

Overall Pressure Level Data	Equiv. to 139 db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.180)}{(2)(1)(.52)} = .025 \quad psi$$



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CALC		REVISED	DATE
CHECK	JOA 4/7/61		
APR.			
APR.			

POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT
5 MIN TEST
MIC 2 PANEL 1498 PHASE A
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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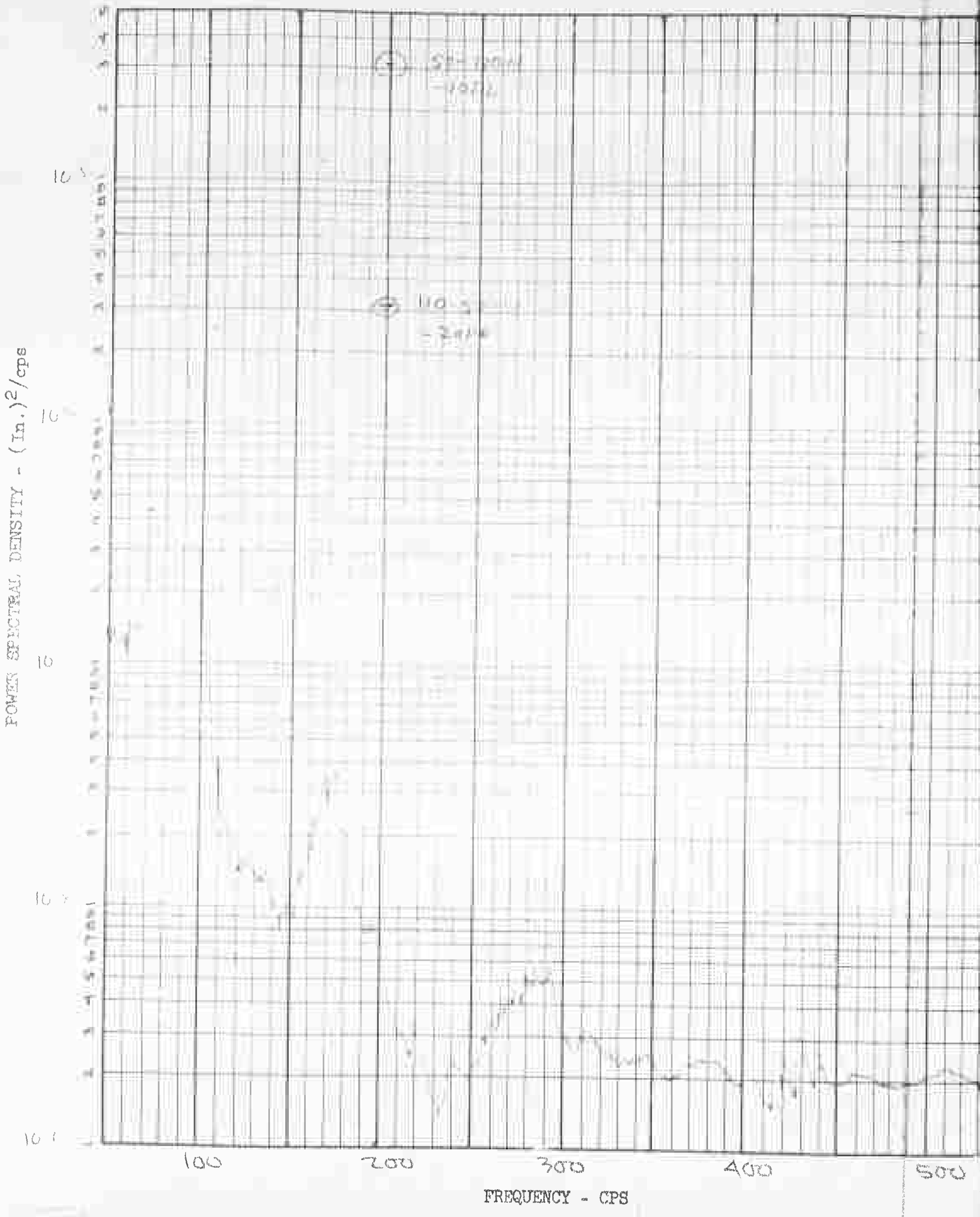


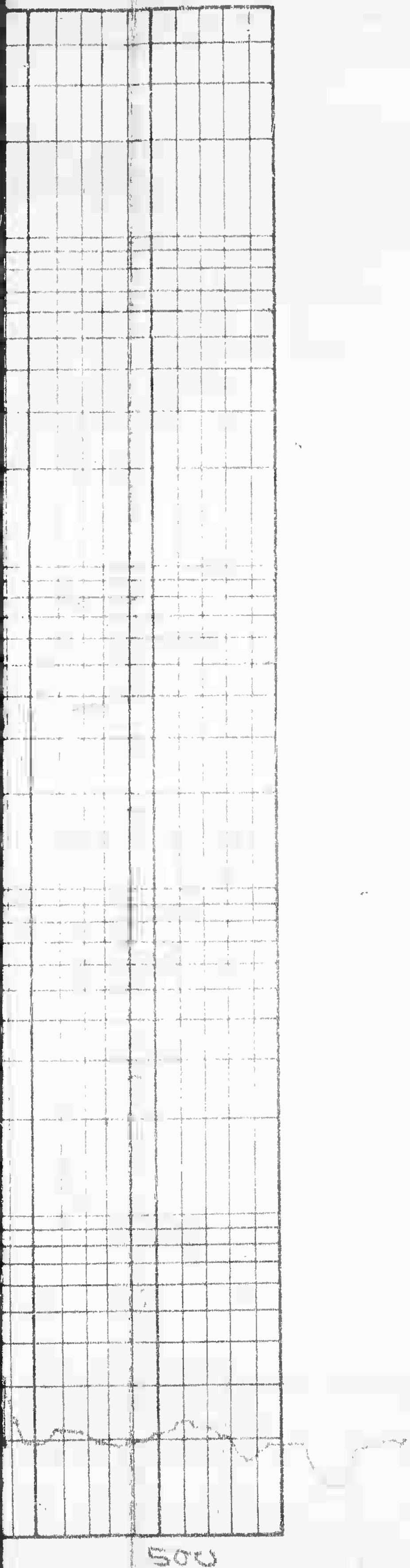
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 4 Sec.
___ cycles from ___ to ___ cps   Anal. Rate 1.25 cps/sec.
___ cycles from ___ to ___ cps   Loop Length 4 Sec.

CALC	
CHECK	JOA
APR.	
APR	



DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM	
EWA No. 5593	Panel or Specimen No. 1498

Tape No. 27	Tape Channel 3	Displacement Pickup # 1

Elapsed Test Time +5 MIN.	P/U RMS Level at Sonic Lab. V_L = .250 Volts

CALIBRATION

Tape No. 27	Tape Channel 6	Data Tape RMS Volt V_R = .245

Calibration Voltage
V_a = 5 V_{rms} into Line Amp.; V_c = .52 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .500

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .00354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

Equivalent of Calibration for PSD Plots

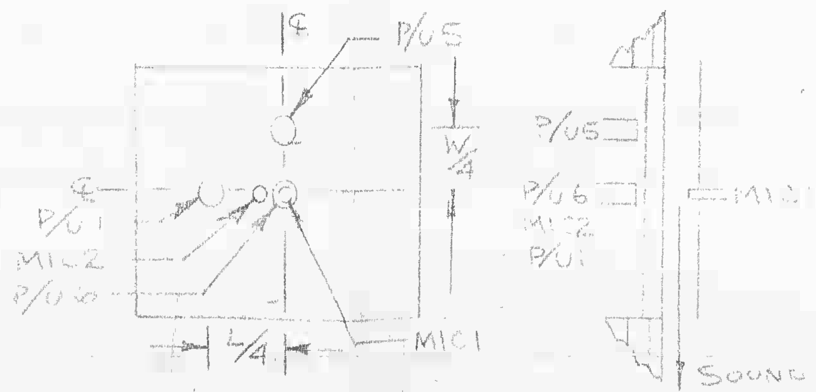
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(1)(1)}\right]^2 = 3.13 \times 10^{-4} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting -10 db 50-1100	Log Converter Setting 0 db

Calibration Plotted at
3.13×10^{-5} 50-1100 in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.245)}{(1)(1)(.52)} = .0083 \text{ in.}$$



CALC		REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP P/U 1 PANEL 1498 5 MIN TEST PHASE A BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL. I D6-8000
CHECK	JOA 6/27/61				
APR.					PAGE
APR					FIG 205

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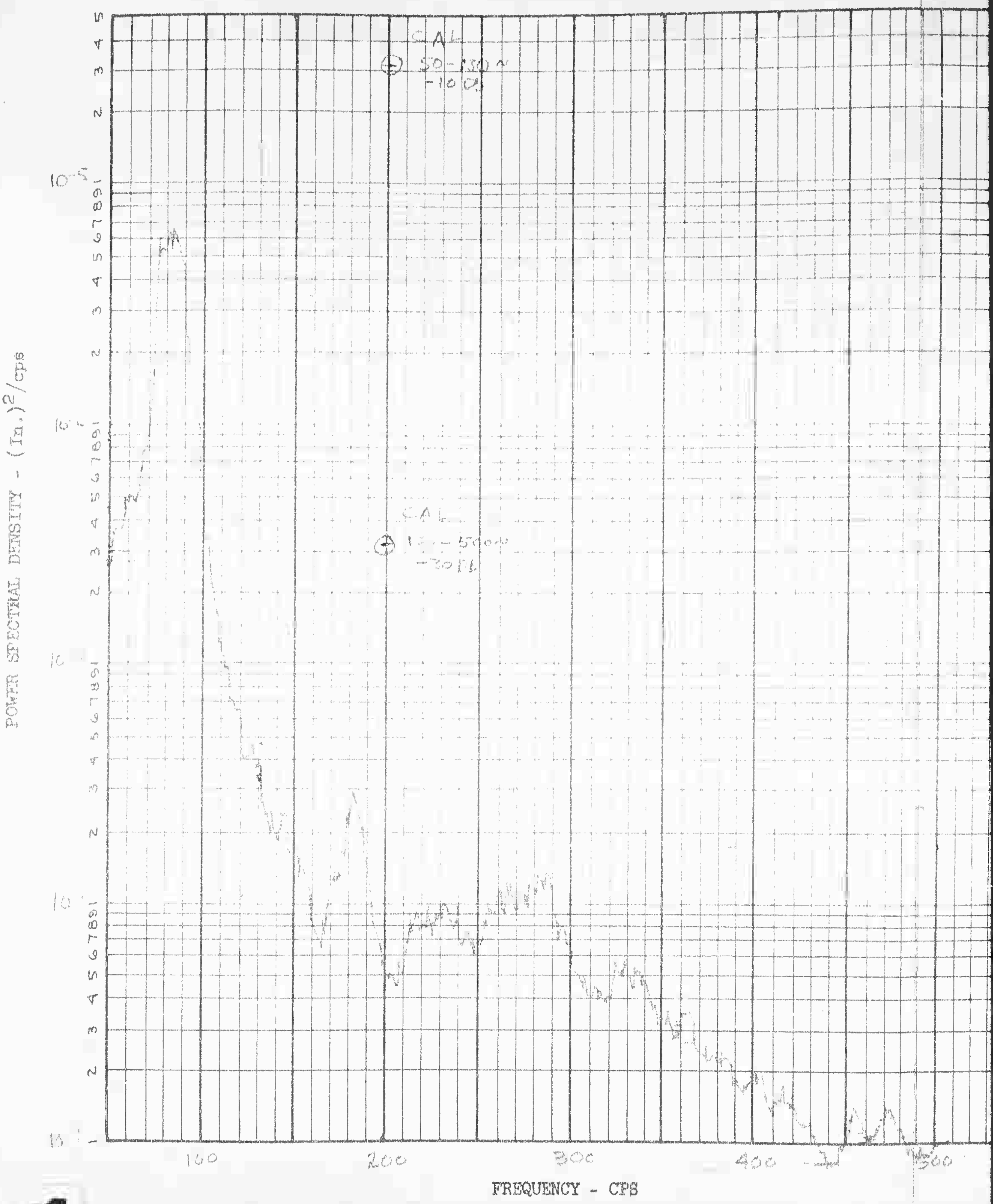


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate .125 cps/sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC	[illegible]
CHECK	JOA
APR.	
APR.	

DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM	
EWA No. 5-593	Panel or Specimen No. 1498

Tape No. 27	Tape Channel 4	Displacement Pickup # 5

Elapsed Test Time 1.5	P/U RMS Level at Sonic Lab. V_L = .320 Volts

CALIBRATION

Tape No. 27	Tape Channel 6	Data Tape RMS Volt V_R = .340

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .52 V_{rms} on Tape @200 cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .500

Lab. Gain
LG = 1.0

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

Equivalent of Calibration for PSD Plots

$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(1)(1)}\right]^2 = 3.13(10^{-4}) \text{ in.}^2/\text{cps}$$

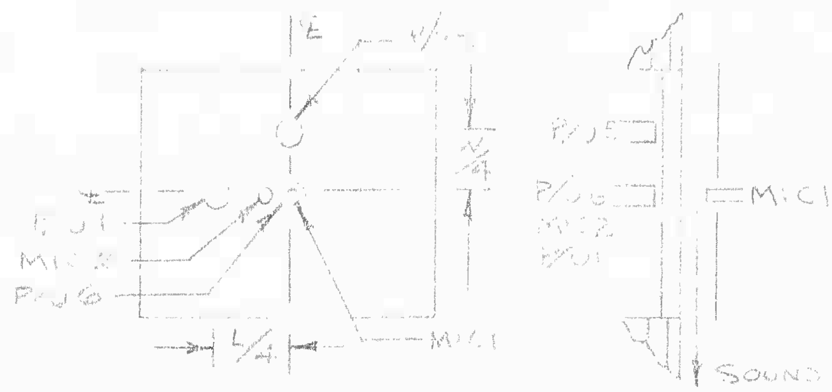
Analyzer Attenuator Setting -10 db

Log Converter Setting 0

Calibration Plotted at in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.340)}{(1)(1)(.52)} = .0116 \text{ in.}$$



CALC			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 5 MIN TEST P/U 5 PANEL 1498 PHASE A BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
CHECK	JOA	4/27/61			
APR.					
APR					

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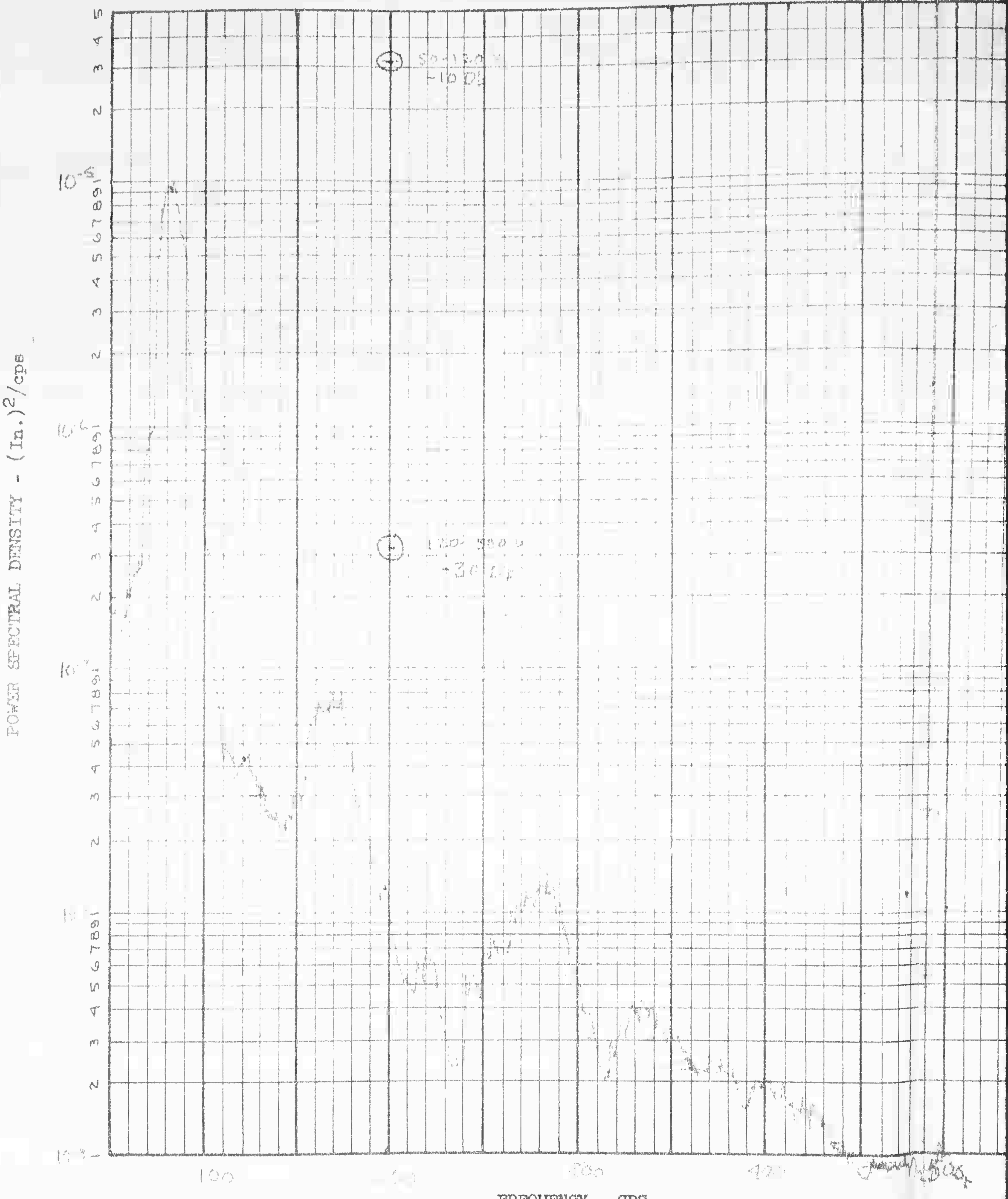
2



1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 4 Sec.	
cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.	
cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC	MCM
CHECK	JOA
APR	
APR	

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM		
EWA No. [illegible]	Panel or Specimen No. 1499	
Tape No. 27	Tape Channel 5	Displacement Pickup # 6
Elapsed Test Time +5	P/U RMS Level at Sonic Lab. V_L = .360 Volts	

CALIBRATION

Tape No. 27	Tape Channel 6	Data Tape RMS Volt V_R = .355

Calibration Voltage
V_a = .[illegible] V_{rms} into Line Amp.; V_c = .52 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .500

Lab. Gain LG = 1.0 | Tape Monitor Gain $TMG = \frac{G_d}{G_c} = 1.0$

Displacement Pickup Sensitivity
S = .[illegible] in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0[illegible]

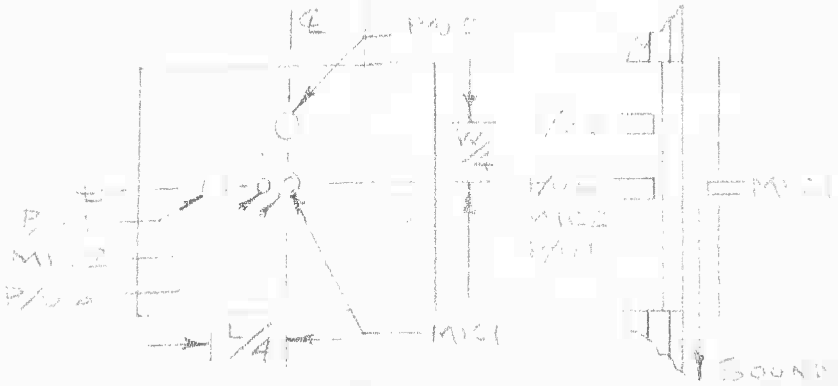
Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(1)(1)}\right]^2 = 3.13(10^{-4}) \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting −10 db | Log Converter Setting 0 db

Calibration Plotted at 3.13(10) in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.355)}{(1)(1)(.52)} = .0121 \text{ in.}$$



CALC	MDM	6-26	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 5 MILS TEST P/U 6 PANEL 1499 PHASE A BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I D2-8008 4
CHECK	DJA	6/27/61				PAGE Fig 207
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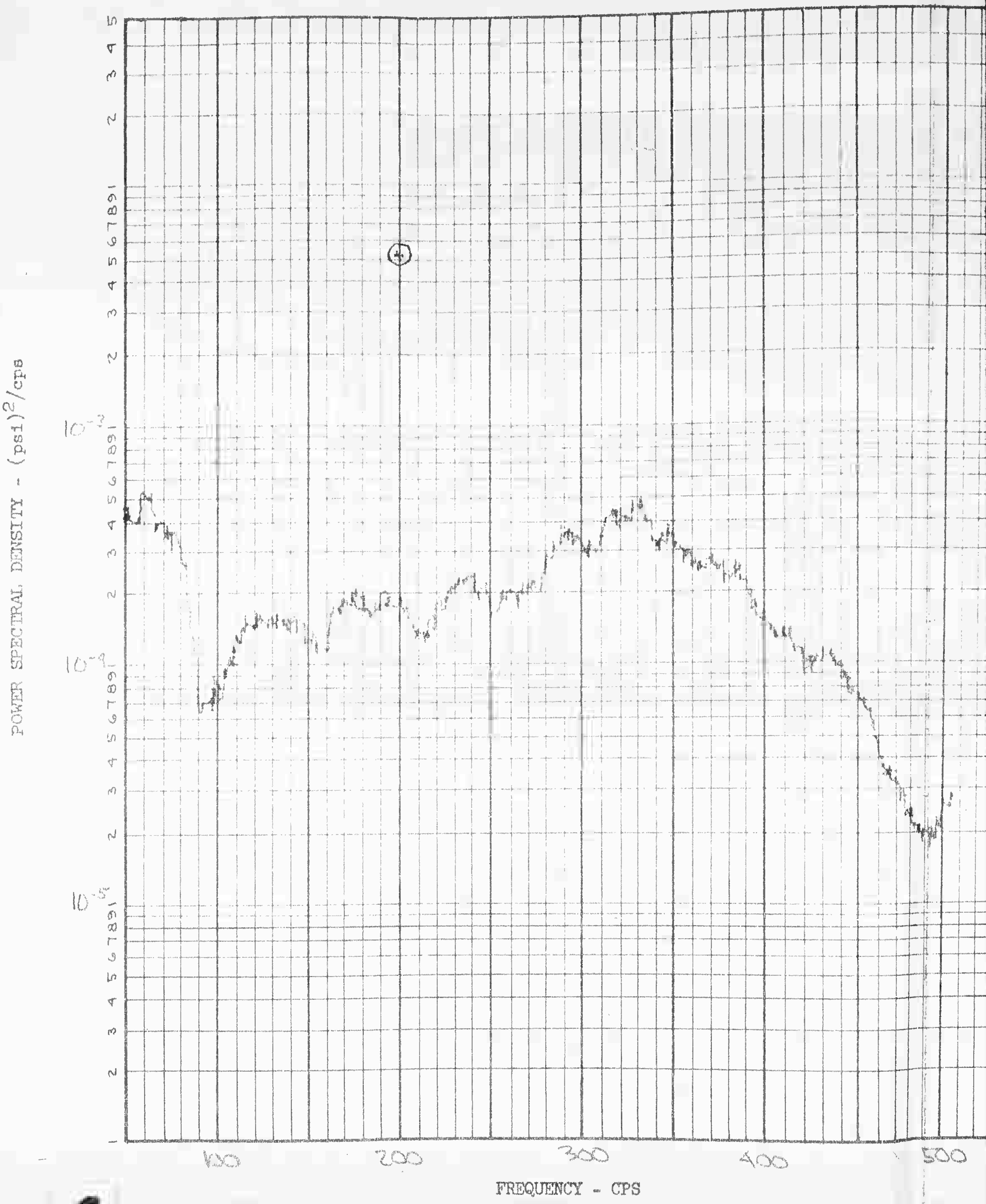

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps — T_c 15 Sec.
cycles from ___ to ___ cps — Anal. Rate .33 cps/Sec.
cycles from ___ to ___ cps — Loop Length 15 Sec.

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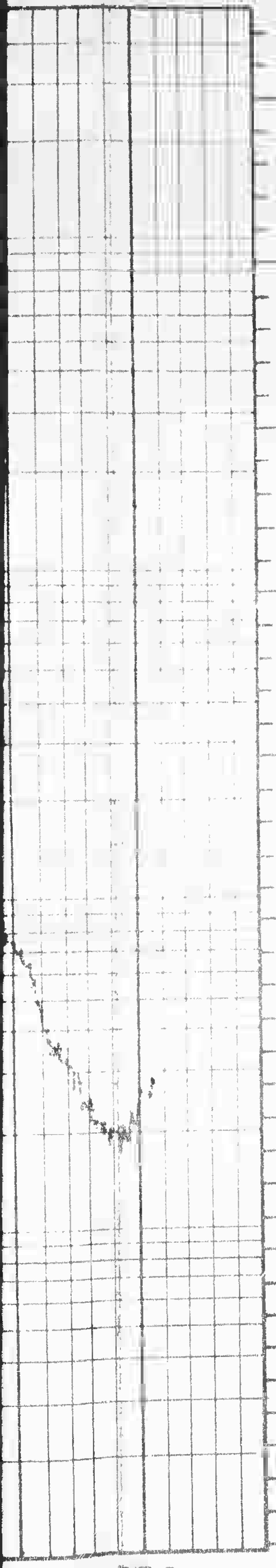


SPECTRUM LEVEL - DECIBELS (Re 0.0002 Microbar)

500

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I ~ PRELIM.		
EWA No. 5-593	Panel or Specimen No. 1498	
Tape No. 61	Tape Channel 1	Mic. No. 1
Elapsed Test Time +605 MIN.	Mic. RMS Level at Sonic Lab. V_L = 1.25 Volts	

CALIBRATION

Tape No. 61	Tape Channel 6	Data Tape RMS Volt V_R = .225

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .48 V_{rms} on Tape @200cps

Line Amplifier Settings
For Calibration G_c = .500; for Data G_d = .100

Lab. Gain
LG = 10

Tape Monitor Gain $TMG = \frac{G_d}{G_c} = .2$

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S = .145$

Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left(\frac{.145}{.2\,(1)}\right)^2 = 5.2 \times 10^{-1} \text{ psi}^2/\text{cps}$$

Analyzer Attenuator Setting -20 db

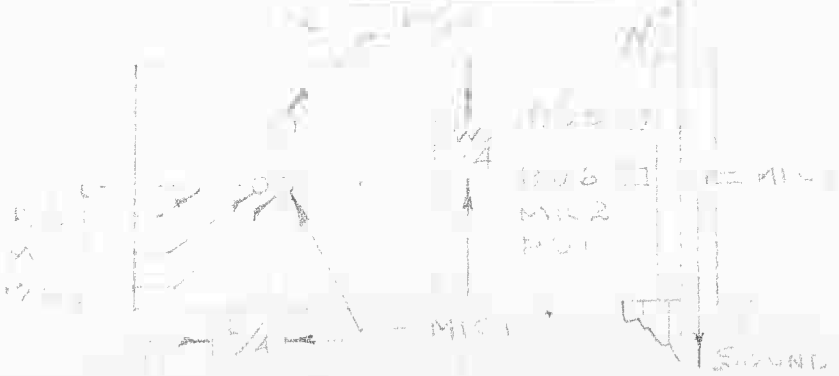
Log Converter Setting 0 db

Calibration Plotted at 5.2 (10^{-1}) psi^2/cps

Overall Pressure Level Data

Equiv. to 161.5 db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.225)}{(.2)(1)(.48)} = .340 \text{ psi}$$



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POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT 161.5 db
0.5 MIN TEST
MIC #1 PANEL 1498 PHASE "D"
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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FIG 208

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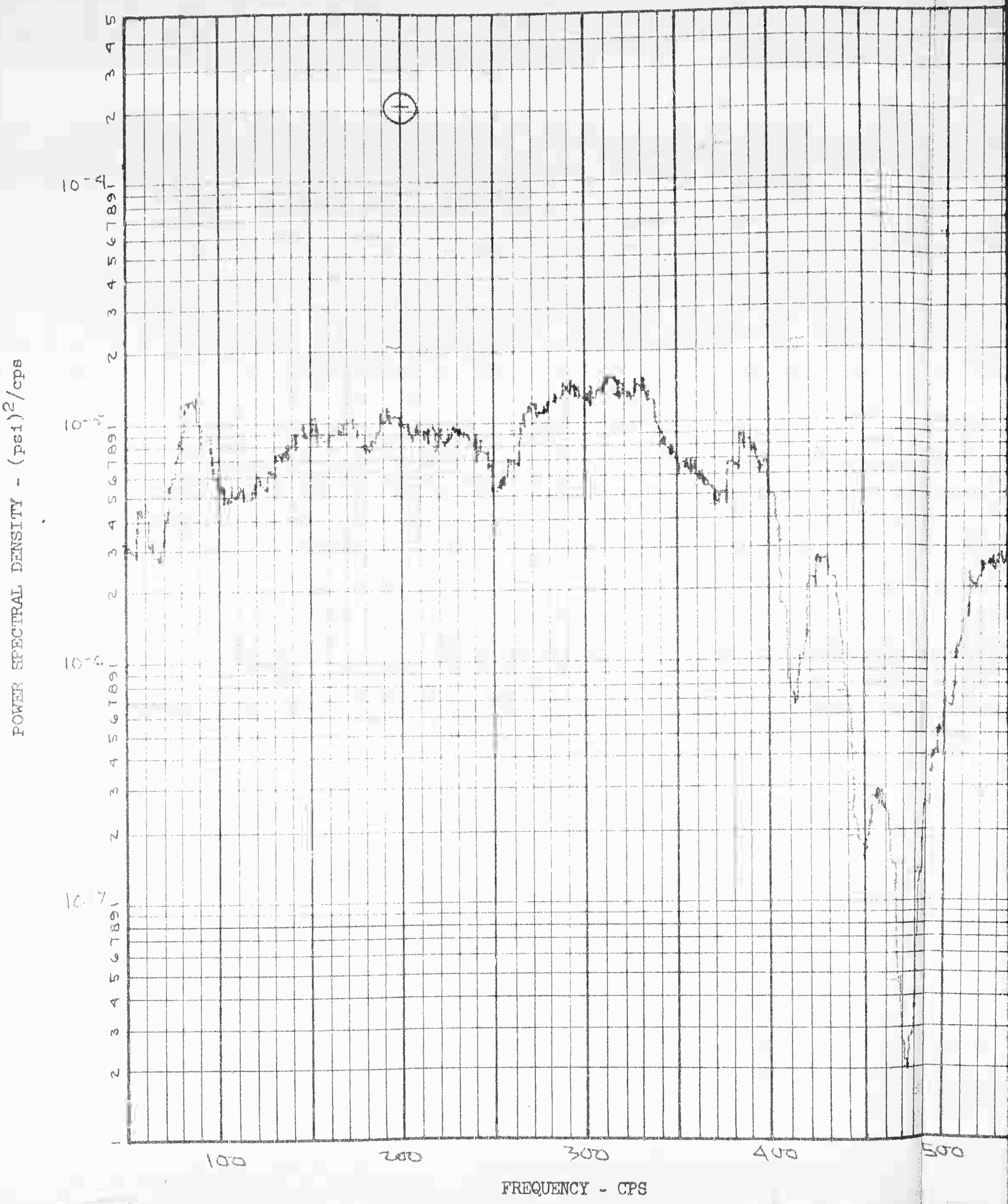

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 15 Sec.
___ cycles from ___ to ___ cps   Anal. Rate .33 cps/Sec.
___ cycles from ___ to ___ cps   Loop Length 15 Sec.

CALC	JOA
CHECK	
APR.	
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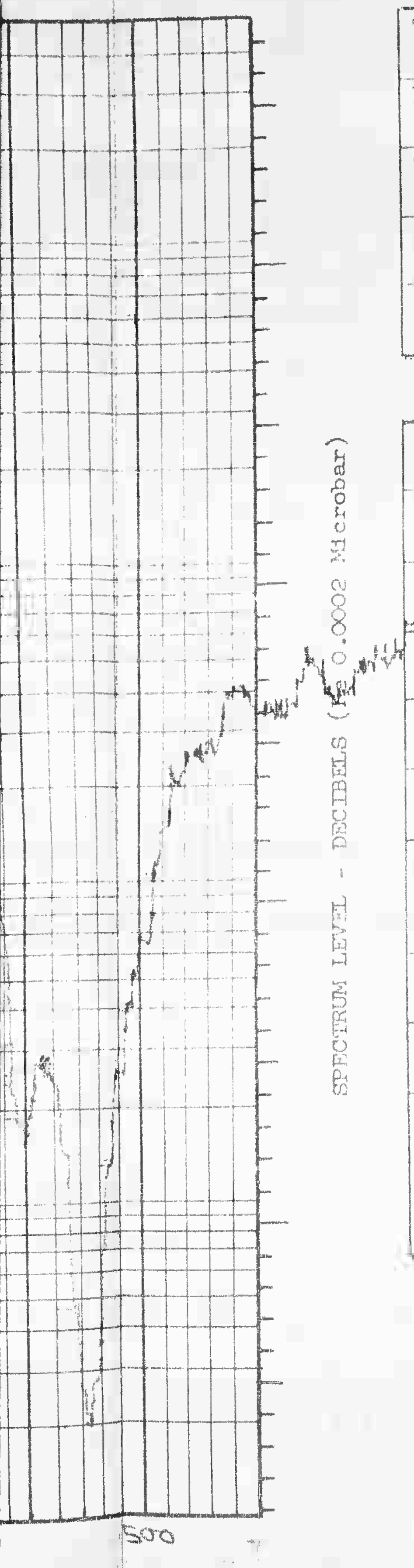


DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I ~ PRELIM'	
EWA No. 5-593	Panel or Specimen No. 1498
Tape No. 61 / Tape Channel 2	Mic. No. 2
Elapsed Test Time +60.5 MIN.	Mic. RMS Level at Sonic Lab. V_L = .250 Volts

CALIBRATION

Tape No. 61	Tape Channel 6	Data Tape RMS Volt V_R = .230

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .48 V_{rms} on Tape @200cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .500

Lab. Gain LC = 1.0 | Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S$ = .145

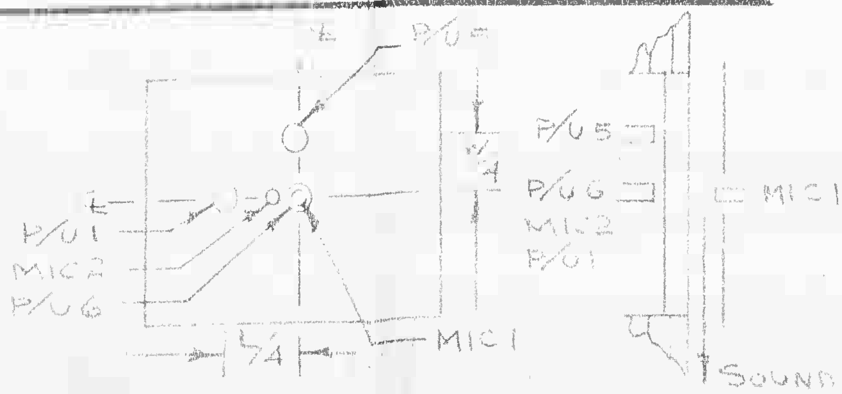
Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LC)}\right)^2 = \left(\frac{.145}{(1)(1)}\right)^2 = 2.1\times10^{-2} \text{ psi}^2/\text{cps}$$

Analyzer Attenuator Setting -20 db | Log Converter Setting 0 db

Calibration Plotted at 2.1 (10^-9) psi²/cps

Overall Pressure Level Data | Equiv. to 147.6 db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.230)}{(1.0)(1)(.48)} = .070 \text{ psi}$$



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CALC	JOA	6/27/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 162.546 0.5 MIN TEST MIC #2 PANEL 1498 PHASE "D" BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I D2-80084 PAGE FIG 209
CHECK						
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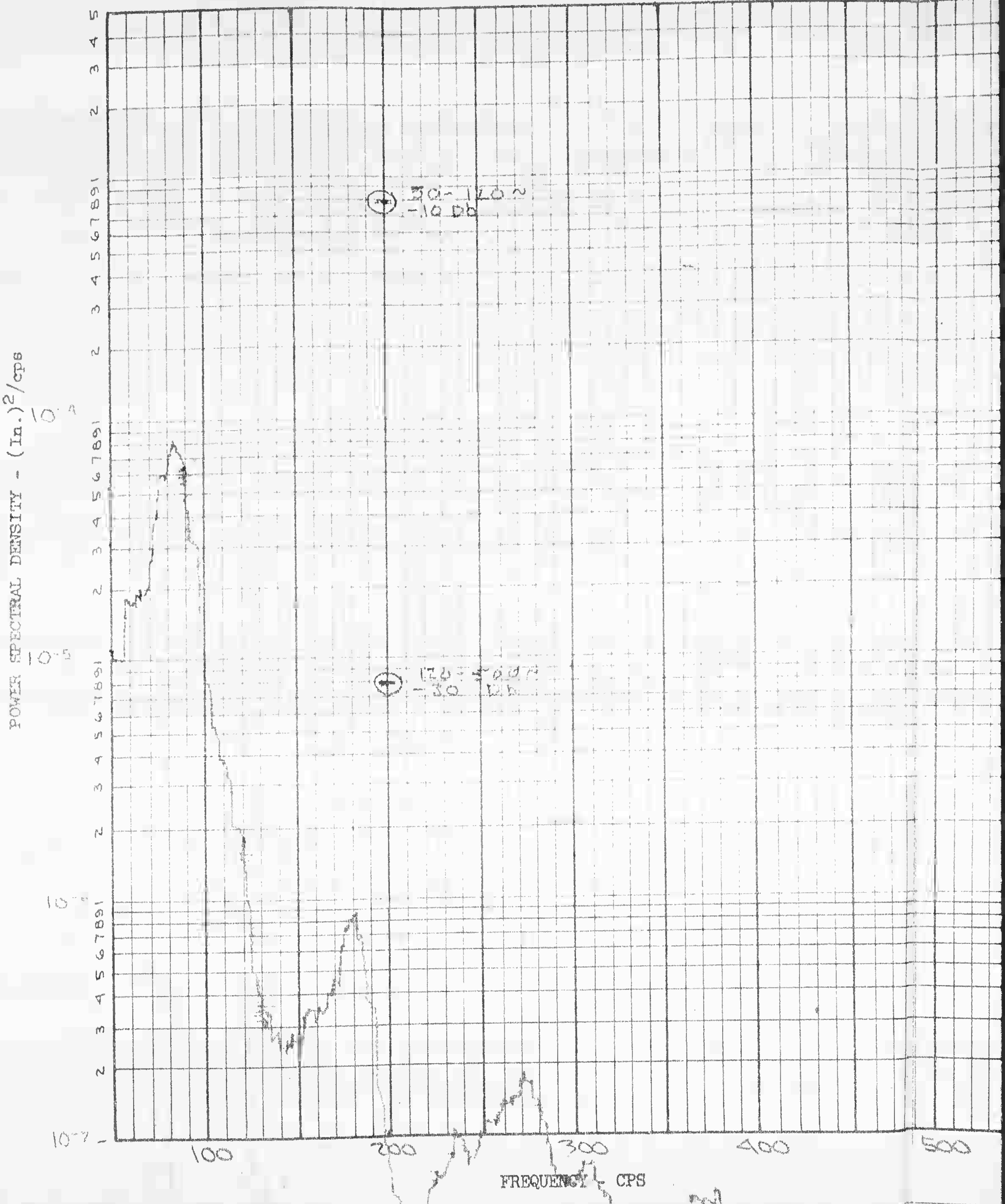

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps

__ cycles from __ to __ cps

__ cycles from __ to __ cps

T_c 15 Sec.

Anal. Rate 33 cps/sec.

Loop Length 15 Sec.

CALC.	JOA
CHECK	
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DATA IDENTIFICATION

Test Title PANEL ATTACH. TYPE I - PRELIM.	
EWA No. 5-593	Panel or Specimen No. 1498
Tape No. 61 / Tape Channel 3	Displacement Pickup # 1
Elapsed Test Time +60.5 MIN	P/U RMS Level at Sonic Lab. V_L = .870 Volts

CALIBRATION

Tape No. 61	Tape Channel 6	Data Tape RMS Volt V_R = .170

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .48 V_{rms} on Tape @200 cps

Line Amplifier Settings
For Calibration G_c = 500; for Data G_d = 100

Lab. Gain
LG = 1

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .2

Displacement Pickup Sensitivity
S = .0354 in./Volt

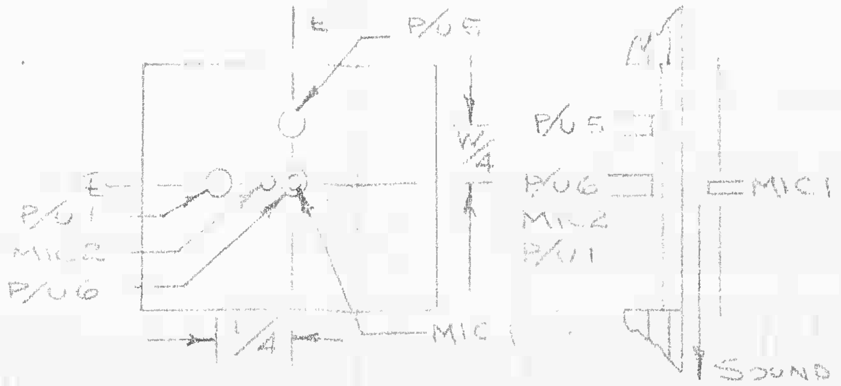
Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMC)(LG)}\right)^2 = \left(\frac{.0177}{(.2)(1)}\right)^2 = 7.8 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting -10 / -30 db 50-1200 / 120-5000 Log Converter Setting 0 db

Calibration Plotted at
7.8 (10^-4) in.²/cps

Overall Deflection Level of Data
$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMC)(LG)(V_c)} = \frac{(.0177)(.170)}{(.2)(1)(.48)} = .0314 \text{ in.}$$



2

CALC	JOA	6/27/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 0.5 MIN TEST 162 db P/U #1 PANEL 1493 PHASE "D" BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
CHECK					VOL I D2-80084
APR.					PAGE FIG 2.0
APR.					

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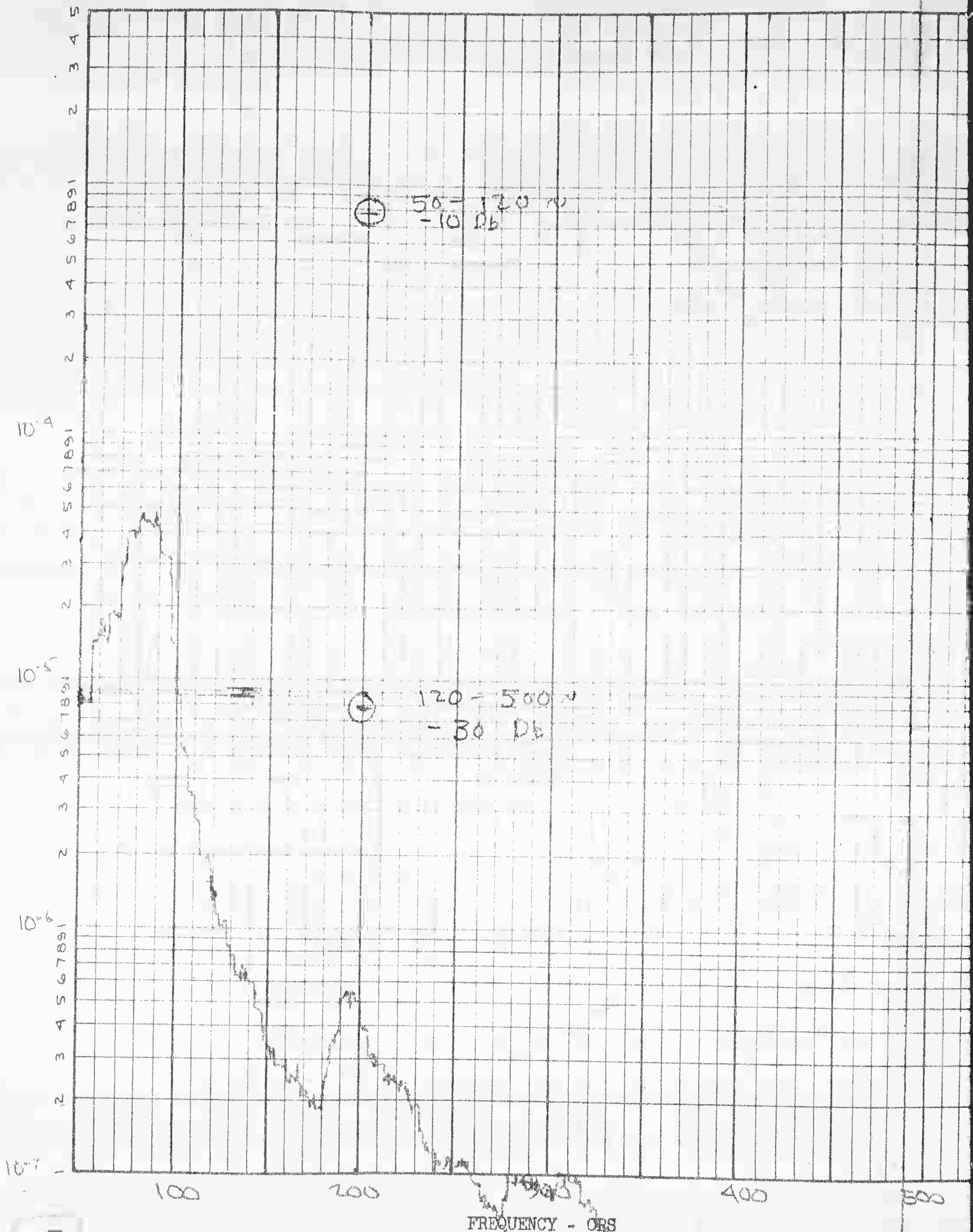

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ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps
___ cycles from ___ to ___ cps
___ cycles from ___ to ___ cps

T_c 15 Sec.
Anal. Rate .33 cps/sec.
Loop Length 15 Sec.

CALC JOA
CHECK
APR.

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I ~ PRELIM.	
EWA No. 5-593	Panel or Specimen No. 1498
Tape No. 61	Tape Channel 4
Displacement Pickup # 5	
Elapsed Test Time +60.5 MIN	P/U RMS Level at Sonic Lab. V_L = Volts

CALIBRATION

Tape No. 61	Tape Channel 6	Data Tape RMS Volt V_R = .210

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .485 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = 500 ; for Data G_d = 100

Lab. Gain
LG = 10

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .2

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

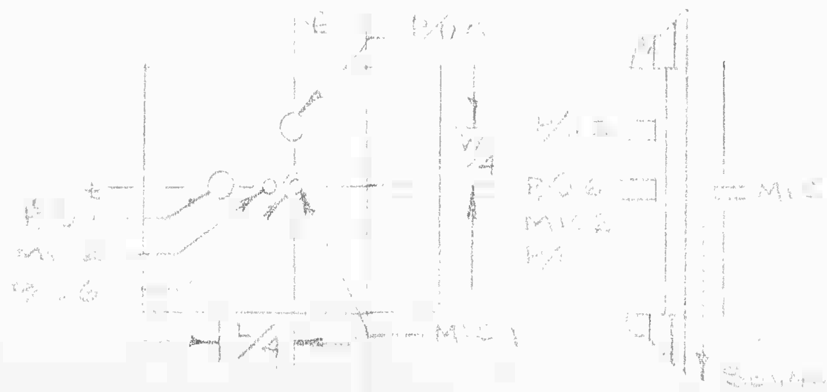
Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{.0177}{(.2)(1)}\right)^2 = 7.8 \times 10^{-3} \text{ in.}^2/\text{cps}$$

Analyzer Attenuator Setting -10 / -30 db (0-417 / 150-500) Log Converter Setting 0 db

Calibration Plotted at in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.210)}{(.2)(1)(.485)} = .0383 \text{ in.}$$



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POWER SPECTRAL DENSITY ANALYSIS
OF DISPLACEMENT PICKUP
0.3 MIL TEST 162.5db
P/U #5 PANEL 1498 PHASE "D"

BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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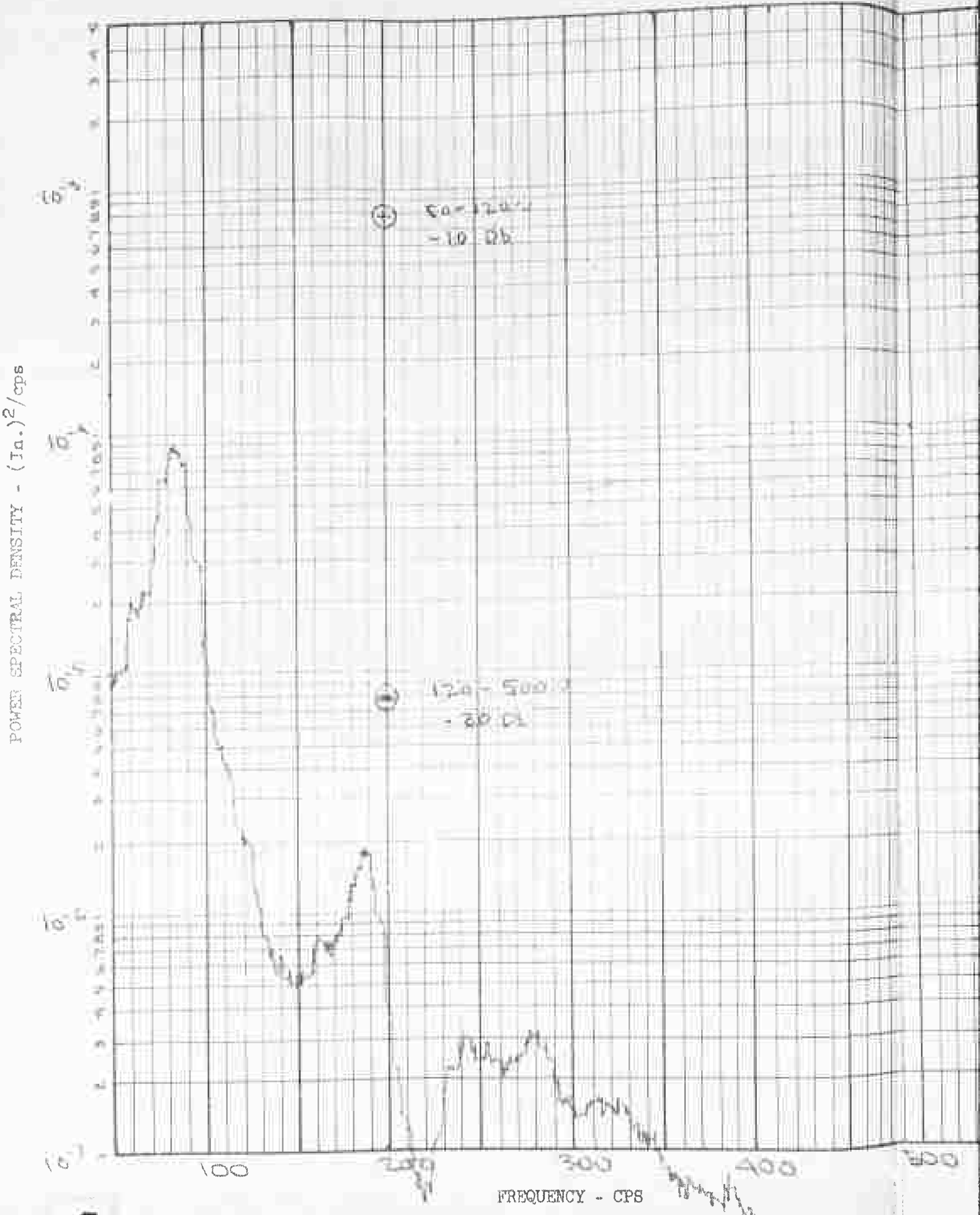


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps $\quad$ T_c 15 Sec.

___ cycles from ___ to ___ cps $\quad$ Anal. Rate 33 cps/sec.

___ cycles from ___ to ___ cps $\quad$ Loop Length 15 Sec.

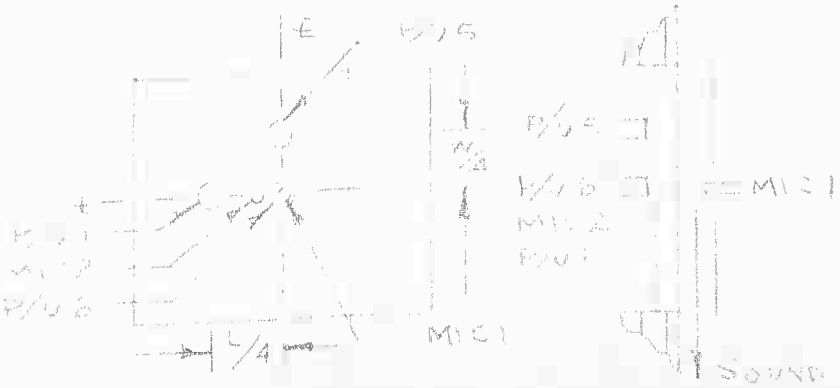
CALC
CHECK
APR.

DATA IDENTIFICATION

Test Title PANEL ATTACH. TYPE I ~ PRELIM.		
EWA No. 5-593	Panel or Specimen No. 1498	
Tape No. 61	Tape Channel 5	Displacement Pickup # 6
Elapsed Test Time +60.5 MIN.	P/U RMS Level at Sonic Lab. V_L = 1.40 Volts	

CALIBRATION

Tape No. 61	Tape Channel 6	Data Tape RMS Volt V_R = .250
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .485 V_{rms} on Tape @ 200cps		
Line Amplifier Settings For Calibration G_c = 500; for Data G_d = 100		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .2	
Displacement Pickup Sensitivity S = .0354 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .0177		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left(\frac{.0177}{(.2)(1)}\right)^2 = 7.8 \times 10^{-3}$ in.²/cps		
Analyzer Attenuator Setting -10 / -50 db	Log Converter Setting 0 db	
Calibration Plotted at 7.8 (10^{-3}) in.²/cps		
Overall Deflection Level of Data RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.250)}{(.2)(1)(.485)}$ = .0455 in.		



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CALC	JOA	6/27/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 0.5 MIN TEST 162 db P/U # 6 PANEL 1498 PHASE "D" BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I
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APR.						PAGE FIG 212

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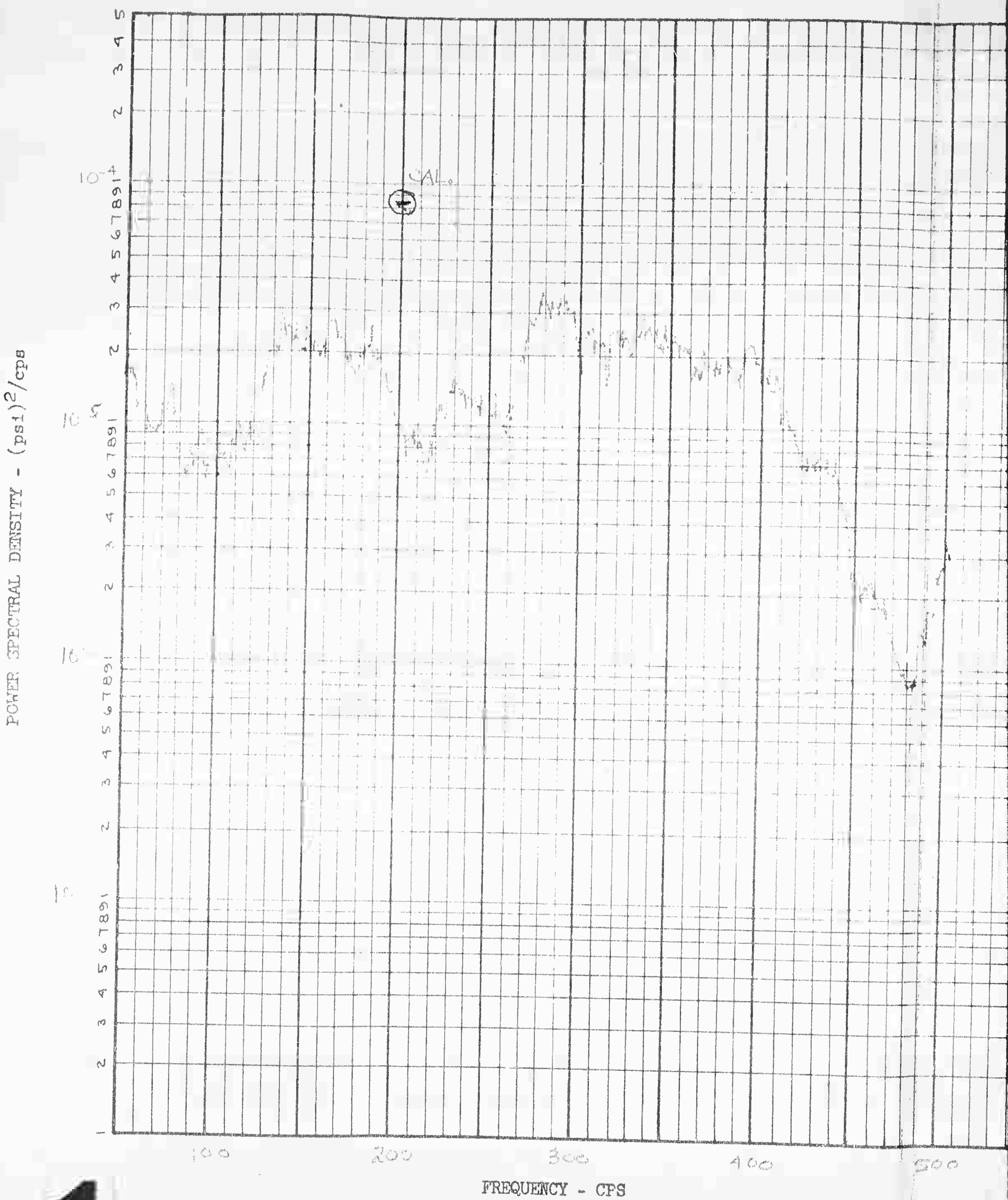

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/Sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

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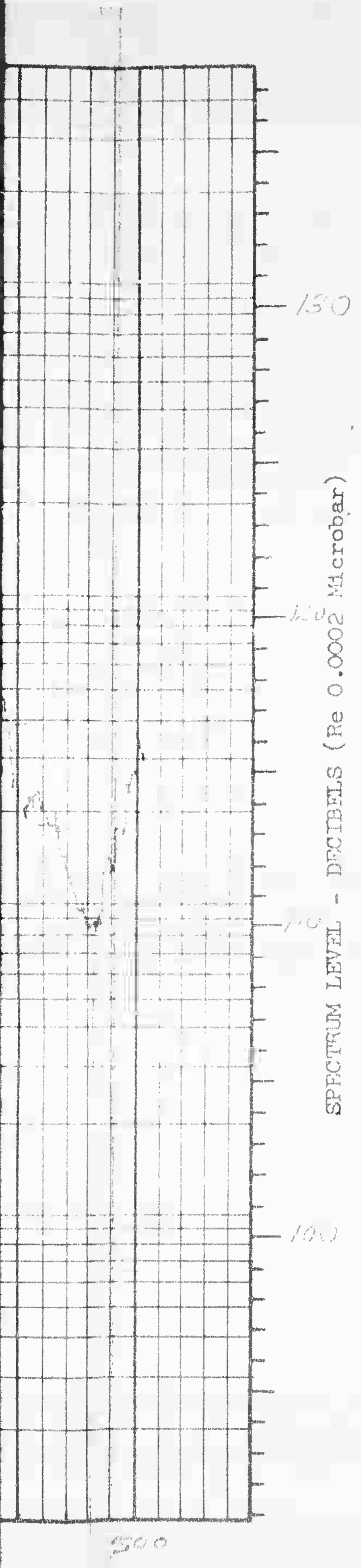
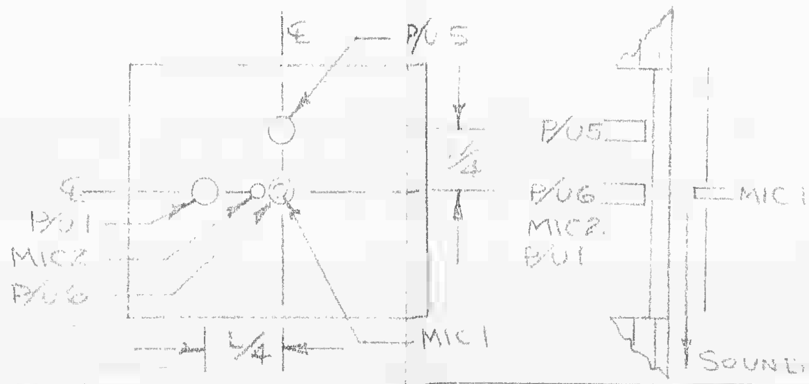


DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PHASE A		
EWA No. 5-595	Panel or Specimen No. 1499	
Tape No. 28	Tape Channel 1	Mic. No. 1
Elapsed Test Time 45	Mic. RMS Level at Sonic Lab. V_L = —— Volts	

CALIBRATION

Tape No. 28	Tape Channel 6	Data Tape RMS Volt V_R = .192
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @200cps		
Line Amplifier Settings For Calibration G_c = .500 ; for Data G_d = .250		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .50	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 150 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(.5)(1)}\right]^2$ 8.41 (10^{-2}) psi²/cps		
Analyzer Attenuator Setting −30 db	Log Converter Setting 0 db	
Calibration Plotted at 8.41 (10^{-5}) psi²/cps		
Overall Pressure Level Data RMS pressure level $= \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.192)}{(.5)(1)(.5)} = 0.1113$ psi	Equiv. to 151.0 db SPL	



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POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT
SMAL TEST
MIC 1 PANEL 1499 PHASE A
BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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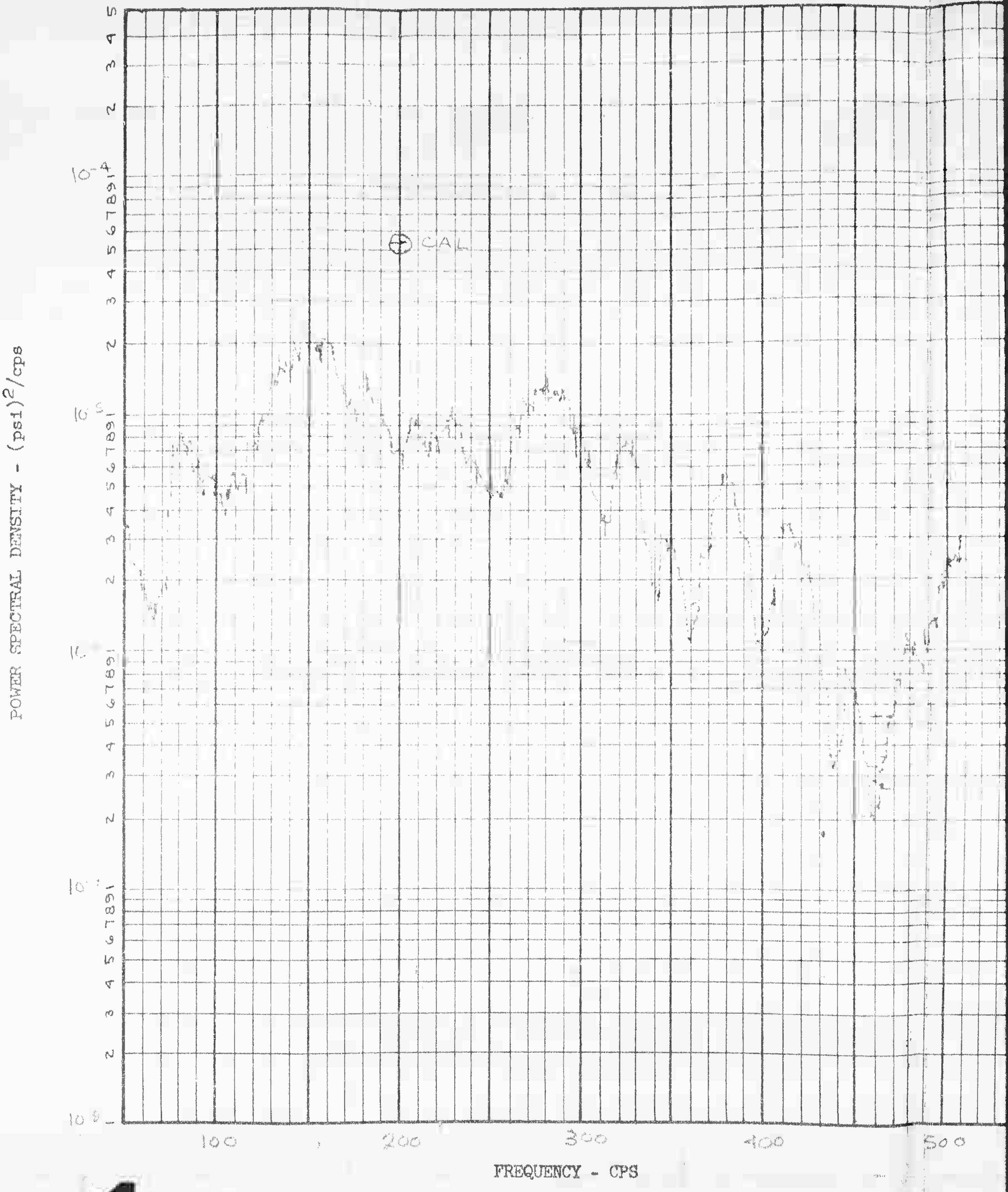

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps T_c 4 Sec.
___ cycles from ___ to ___ cps Anal. Rate .125 cps/Sec.
___ cycles from ___ to ___ cps Loop Length 4 Sec.

CALC.	[illegible]
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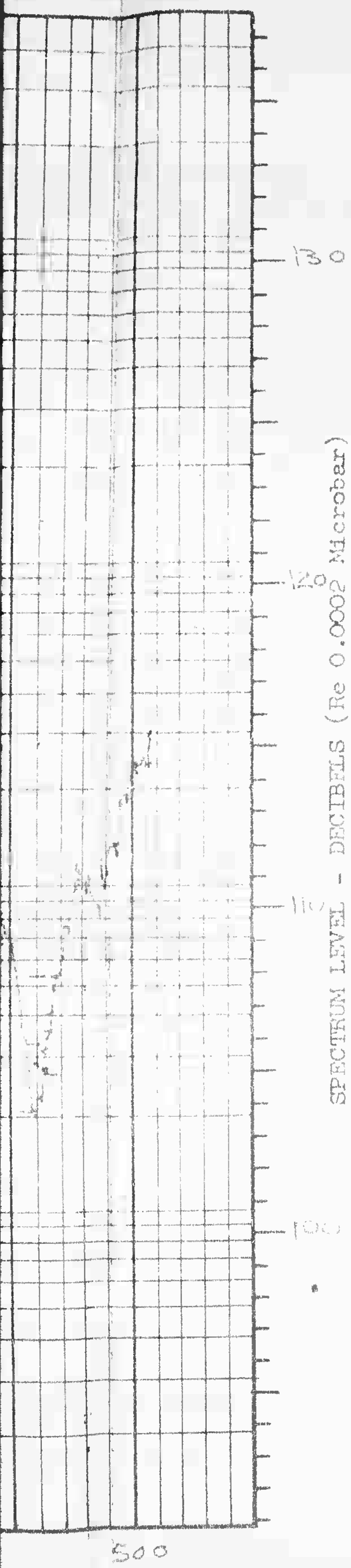
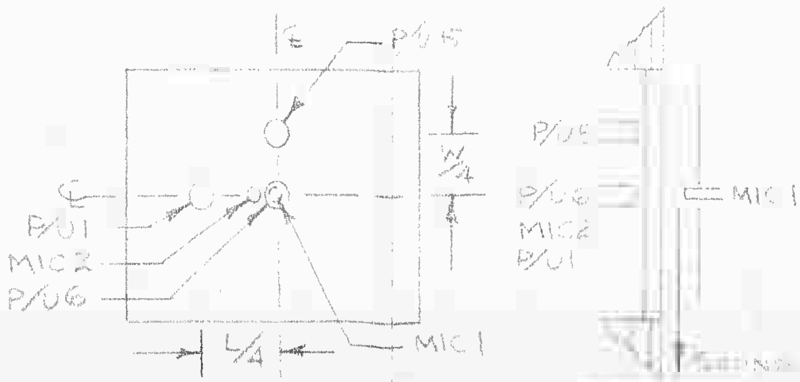


DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM	
EWA No. 5-593	Panel or Specimen No. 1499
Tape No. 28 / Tape Channel 2	Mic. No. 2
Elapsed Test Time 45	Mic. RMS Level at Sonic Lab. V_L = —— Volts

CALIBRATION

Tape No. 28	Tape Channel 2	Data Tape RMS Volt V_R = .164
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .510 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .500; for Data G_d = 1.000		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 2.0	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = .145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left(\frac{.145}{(2)(1)}\right)^2 = 5.25(10^{-3})$ psi²/cps		
Analyzer Attenuator Setting -30 db	Log Converter Setting 0 db	
Calibration Plotted at 5.25(10⁻⁵) psi²/cps		
Overall Pressure Level Data	Equiv. to 138.0 db SPL	
RMS pressure level = $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{.145\,(.164)}{(2)(1)(.510)}$ = 0.0233 psi		



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POWER SPECTRAL DENSITY ANALYSIS
OF MICROPHONE OUTPUT
MIC 2 PANEL 1499 PHASE A 5 MIN TEST

BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

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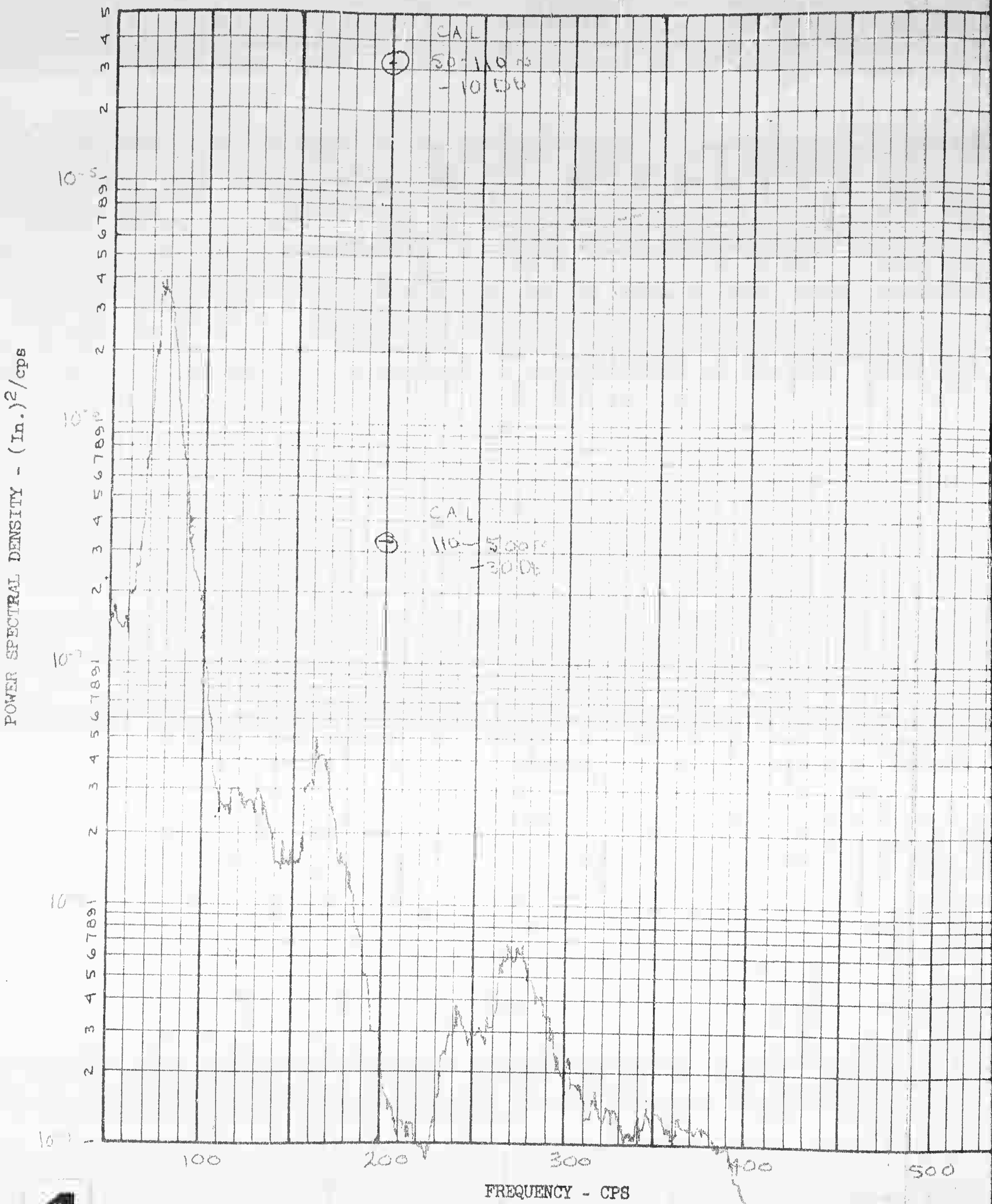

1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps — T_c 4 Sec.
____ cycles from ____ to ____ cps — Anal. Rate 1.25 cps/sec.
____ cycles from ____ to ____ cps — Loop Length 4 Sec.

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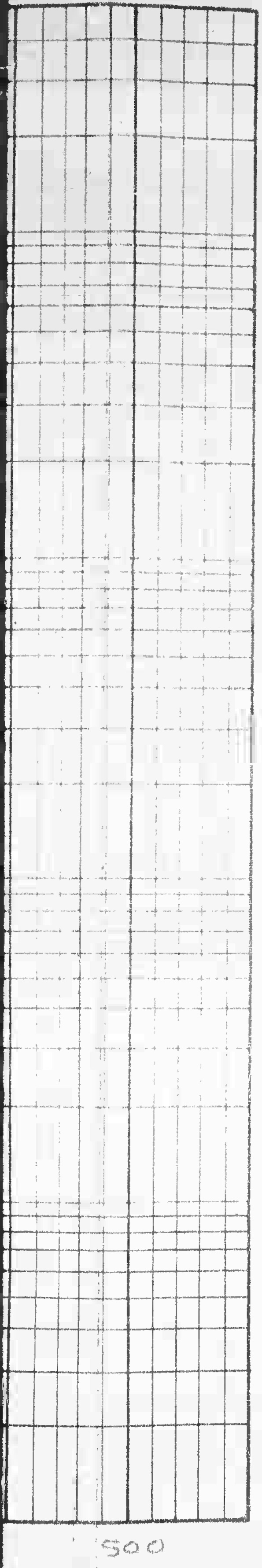


DATA IDENTIFICATION

Test Title PANEL ATTACH TYPE I PRELIM.	
EWA No. 5-593	Panel or Specimen No. 1499
Tape No. 28	Tape Channel 3
Displacement Pickup # 1	
Elapsed Test Time +5	P/U RMS Level at Sonic Lab. V_L = .210 Volts

CALIBRATION

Tape No. 28	Tape Channel 6	Data Tape RMS Volt V_R = .230

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.; V_c = .510 V_{rms} on Tape @ 100 cps

Line Amplifier Settings
For Calibration G_c = .500; for Data G_d = .500

Lab. Gain
LG = 1.0

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{1.0}\right]^2 = 3.13(10^{-4})$ in.^{2}/cps

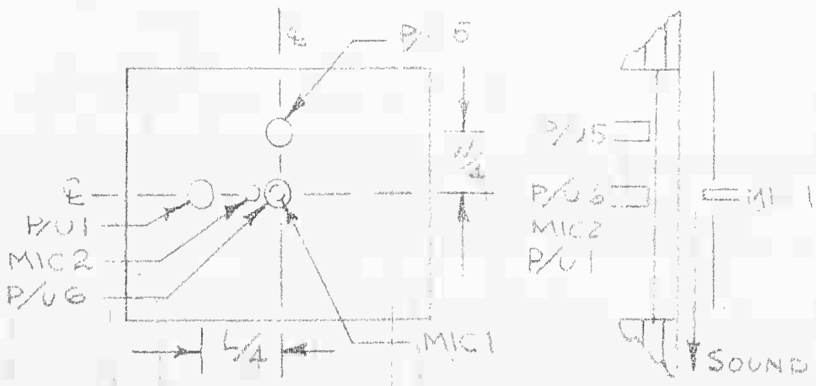
Analyzer Attenuator Setting
-10db 20-1100 / -30db 1100-5000 db

Log Converter Setting
0 db

Calibration Plotted at 3.13(10^{-5}) 20-1100 / 3.13(10^{-7}) 1100-5000 in.^{2}/cps

Overall Deflection Level of Data

RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)}$ = [illegible] = .00874 in.



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CALC	[illegible]	6-4-61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 5 MIN TEST P/U 1 PANEL 1499 PHASE A BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I D2-80084
CHECK	CBT	6/30/61				
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APR.						PAGE FIG. 215

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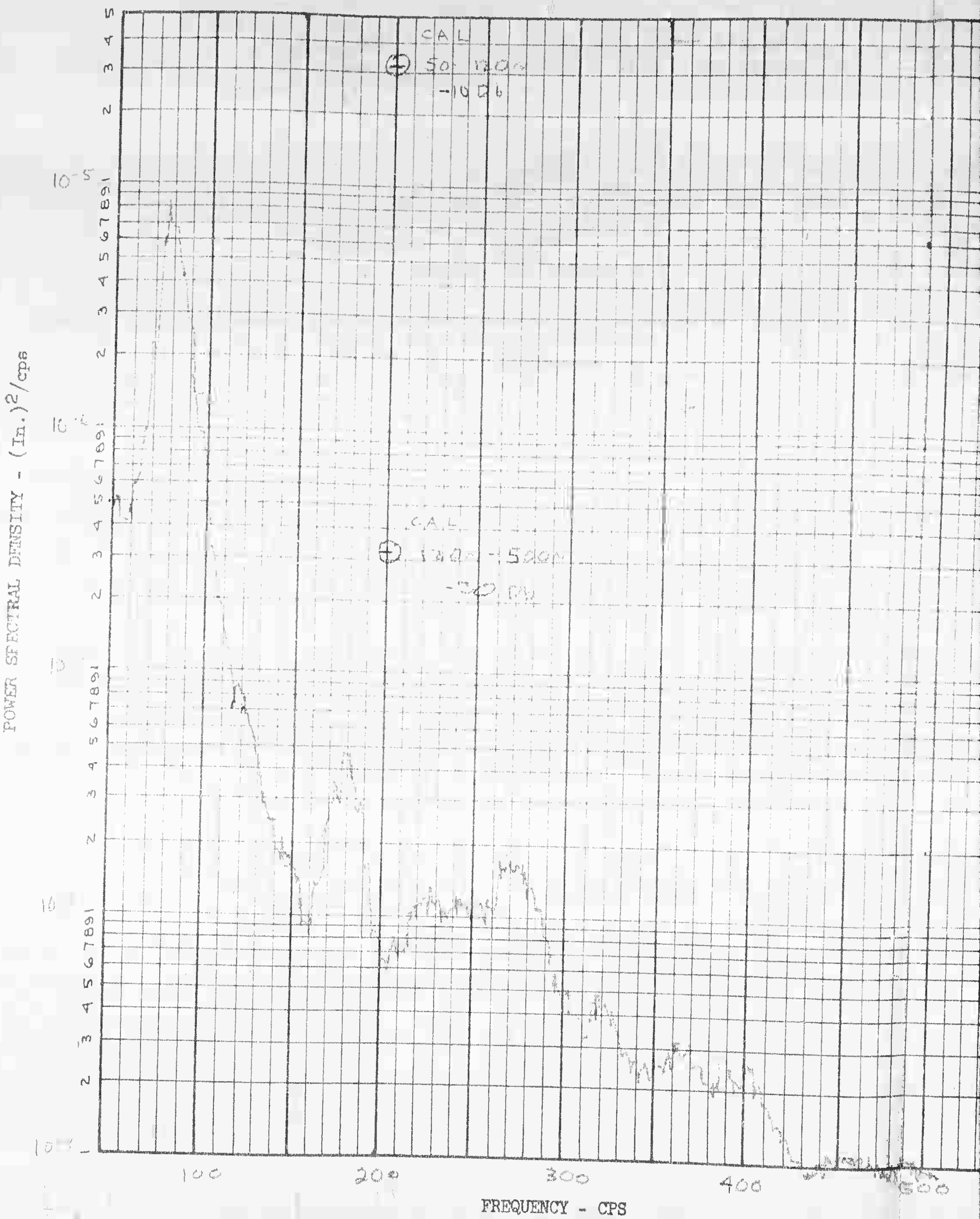


1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC	MJM
CHECK	CBT
APR.	
APR.	

DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM		
EWA No.: 5-593	Panel or Specimen No.: 1499	
Tape No.: 28	Tape Channel: 4	Displacement Pickup #: 5
Elapsed Test Time: +5	P/U RMS Level at Sonic Lab. V_L = .355 Volts	

CALIBRATION

Tape No.: 28	Tape Channel: 6	Data Tape RMS Volt V_R = .350

Calibration Voltage
V_a = .5 V_{rms} into Line Amp.: V_c = .505 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .500

Lab. Gain
LG = 1.0

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Displacement Pickup Sensitivity
S = .0354 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0177

Equivalent of Calibration for PSD Plots
$$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(1)(1)}\right]^2 = 3.13(10^{-4}) \text{ in.}^2/\text{cps}$$

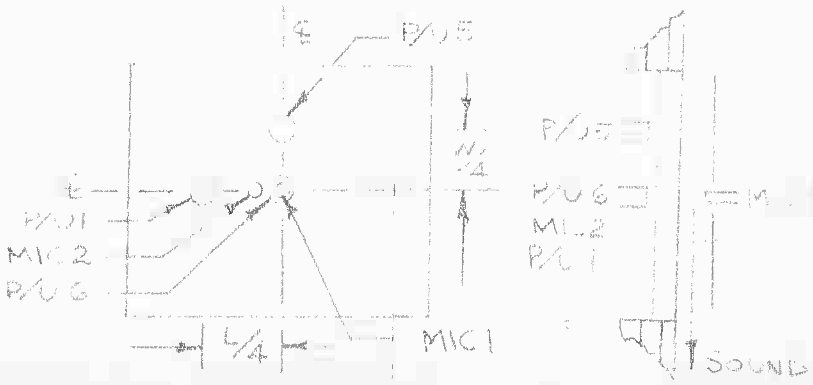
Analyzer Attenuator Setting: [illegible] db

Log Converter Setting: 0 db

Calibration Plotted at [illegible] in.^{2}/cps

Overall Deflection Level of Data

$$\text{RMS Defl. Level} = \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.350)}{(1)(1)(.505)} = .0123 \text{ in.}$$



2

CALC			REVISED	DATE
CHECK	CBT	6/9/61		
APR.				
APR.				

POWER SPECTRAL DENSITY ANALYSIS
OF DISPLACEMENT PICKUP
SIREN TEST
P/U 5 PANEL 1499 PHASE A

BOEING AIRPLANE COMPANY
SEATTLE 24, WASHINGTON

Vol. I
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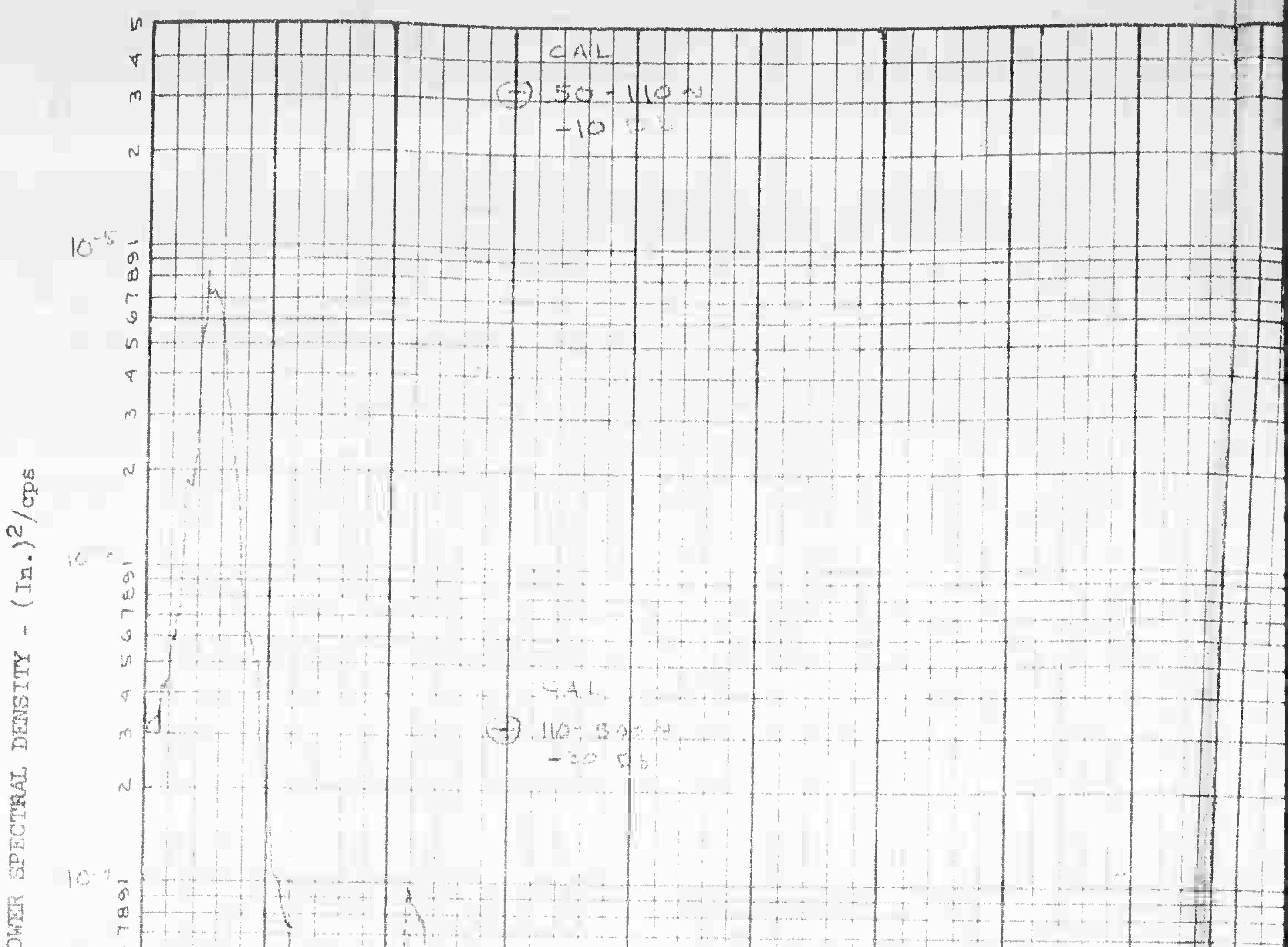
PAGE Fig 216

2-5353-7-9



1

ANALYSIS VARIABLES

Bandwidth

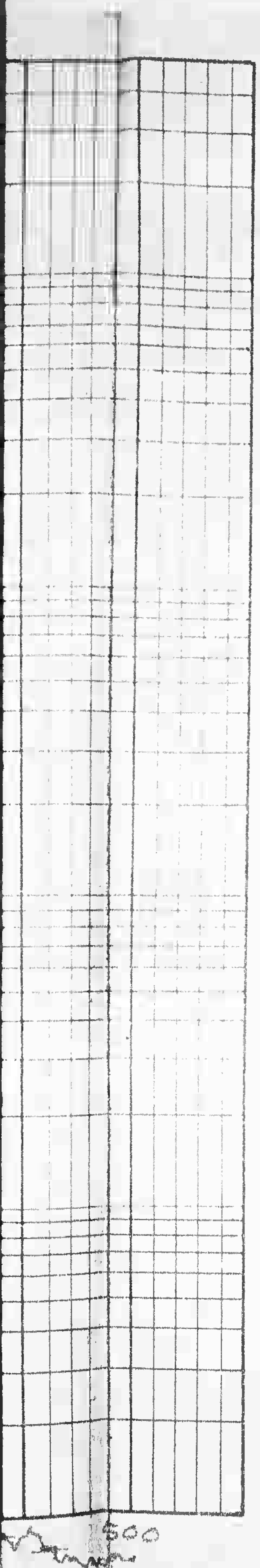
5 cycles from 50 to 500 cps	T_c 4 Sec.	
___ cycles from ___ to ___ cps	Anal. Rate 1.25 cps/sec.	
___ cycles from ___ to ___ cps	Loop Length 4 Sec.	

CALC

CHECK

APR.

APR.

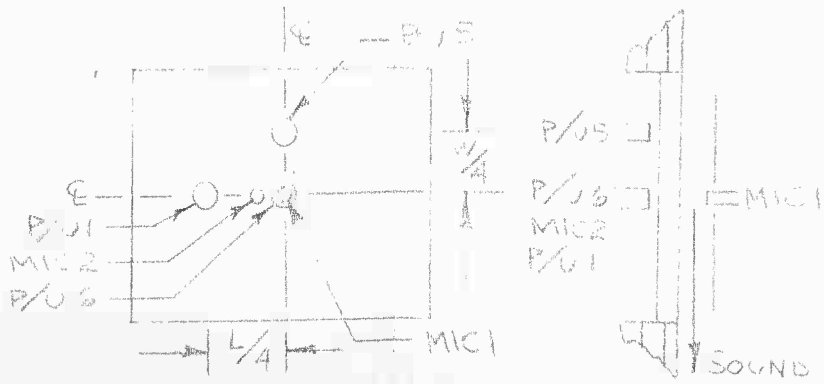


DATA IDENTIFICATION

Test Title: PANEL ATTACH TYPE I PRELIM		
EWA No. 5-593	Panel or Specimen No. 1499	
Tape No. 28	Tape Channel 5	Displacement Pickup # 6
Elapsed Test Time +5	P/U RMS Level at Sonic Lab. V_L = .310 Volts	

CALIBRATION

Tape No. 28	Tape Channel 6	Data Tape RMS Volt V_R = .315
Calibration Voltage V_a = .5 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .500 ; For Data G_d = .500		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0	
Displacement Pickup Sensitivity S = .0354 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .0177		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0177}{(1)(1)}\right]^2 = 3.13(10^{-4})$ in.^{2}/cps		
Analyzer Attenuator Setting [illegible] db; Log Converter Setting 0 db		
Calibration Plotted at [illegible] 3.13 ([illegible]) [illegible] in.^{2}/cps		
Overall Deflection Level of Data RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0177)(.315)}{(1)(1)(.500)} = .0111$ in.		



2

			REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP SIREN TEST P/U 6 PANEL 1499 PHASE A BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON	VOL I
CALC	[illegible]	6-21				
CHECK	CBT	6/30/61				D2-[illegible]
APR.						
APR.						PAGE FIG 217

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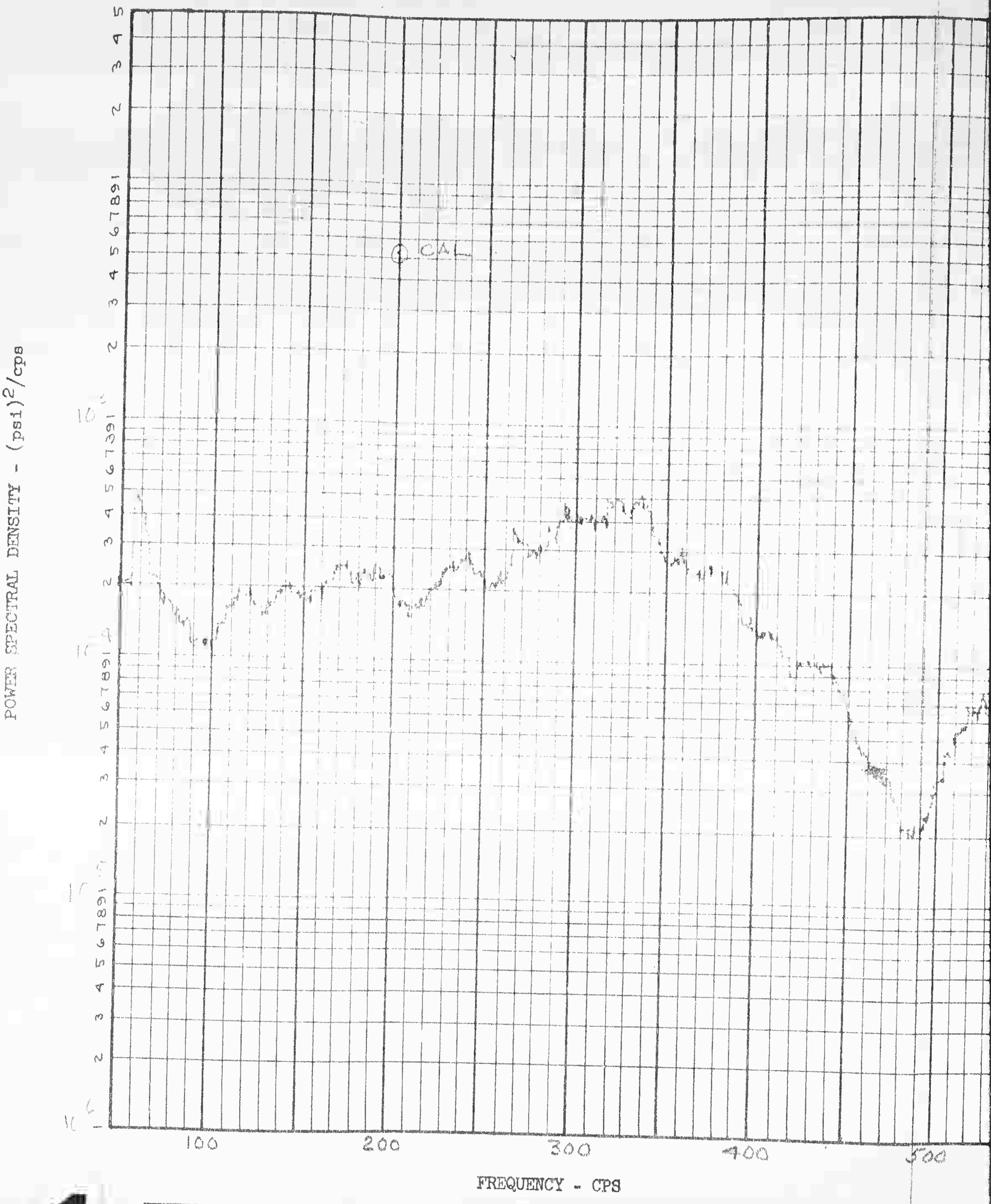


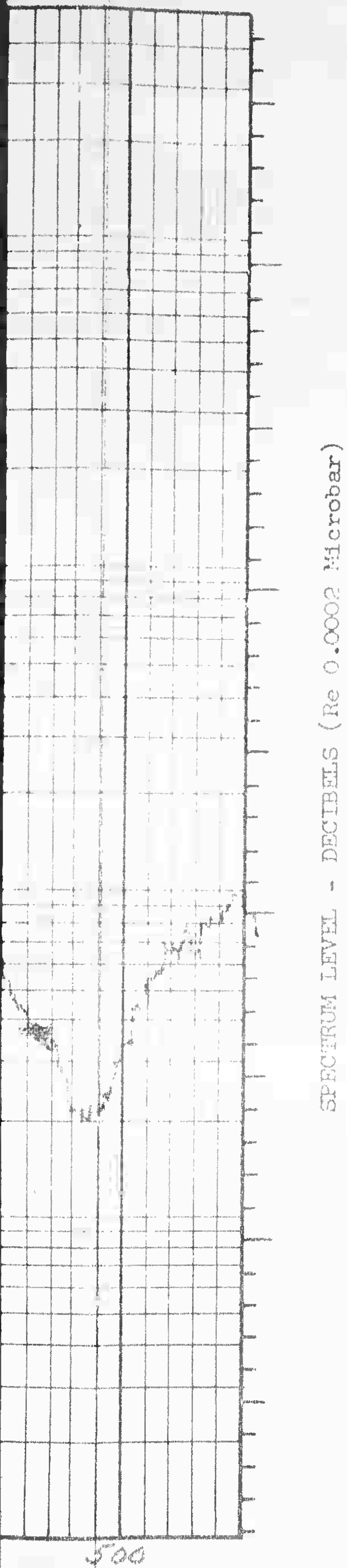
1

ANALYSIS VARIABLES

Bandwidth

.5 cycles from 50 to 500 cps T_c 15 Sec.
___ cycles from ___ to ___ cps   Anal. Rate .333 cps/Sec.
___ cycles from ___ to ___ cps   Loop Length 15 Sec.

CALC	CBI
CHECK	
APR.	
APR.	

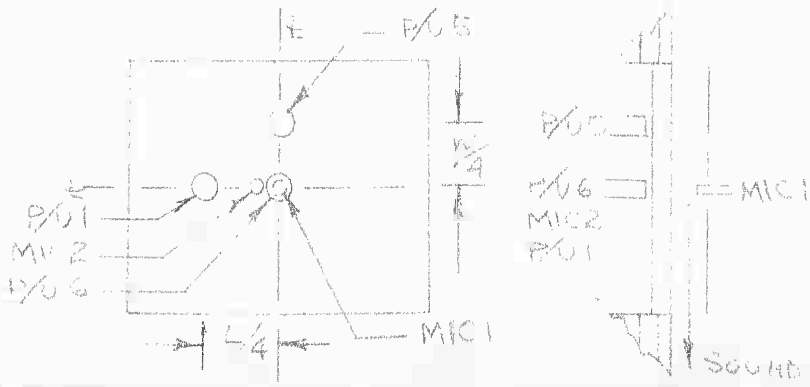


DATA IDENTIFICATION

Test Title PANEL ATTACHMENT - TYPE I		
EWA No. 5-593,	Panel or Specimen No. 1499	
Tape No. 64	Tape Channel 1	Mic. No. 1
Elapsed Test Time 60.5 MIN	Mic. RMS Level at Sonic Lab. V_L = 1.27 Volts	

CALIBRATION

Tape No. 64	Tape Channel 6	Data Tape RMS Volt V_R = .237
Calibration Voltage V_a = .50 V_{rms} into Line Amp.; V_c = .5 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings For Calibration G_c = .500 ; for Data G_d = .100		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .20	
Microphone Sensitivity S = .290 psi/Volt or 1 Volt rms = 160 db SPL		
Equivalent of Calibration - psi $P_c = V_a \cdot S$ = 0.145		
Equivalent of Calibration for PSD Plots $\left(\frac{P_c}{(TMG)(LG)}\right)^2$ = 5.25 x 10^{-1} psi^2/cps		
Analyzer Attenuator Setting db	Log Converter Setting db	
Calibration Plotted at 5.25 x 10^{-3} psi^2/cps		
Overall Pressure Level Data RMS pressure level = $\frac{(P_c)(V_R)}{(TMG)(LG)(V_c)}$ $= \frac{(.145)(.237)}{(.2)(1)(.500)}$ = 0.344 psi	Equiv. to 161.3 db SPL	



CALC	CBT	6/30/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT MIC. #1 PANEL 1499 PHASE "D" 162.5 db 0.5 MIN TEST BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
CHECK					VOL. I D2-80784
APR.					PAGE
APR		6/27/61			FIG 218

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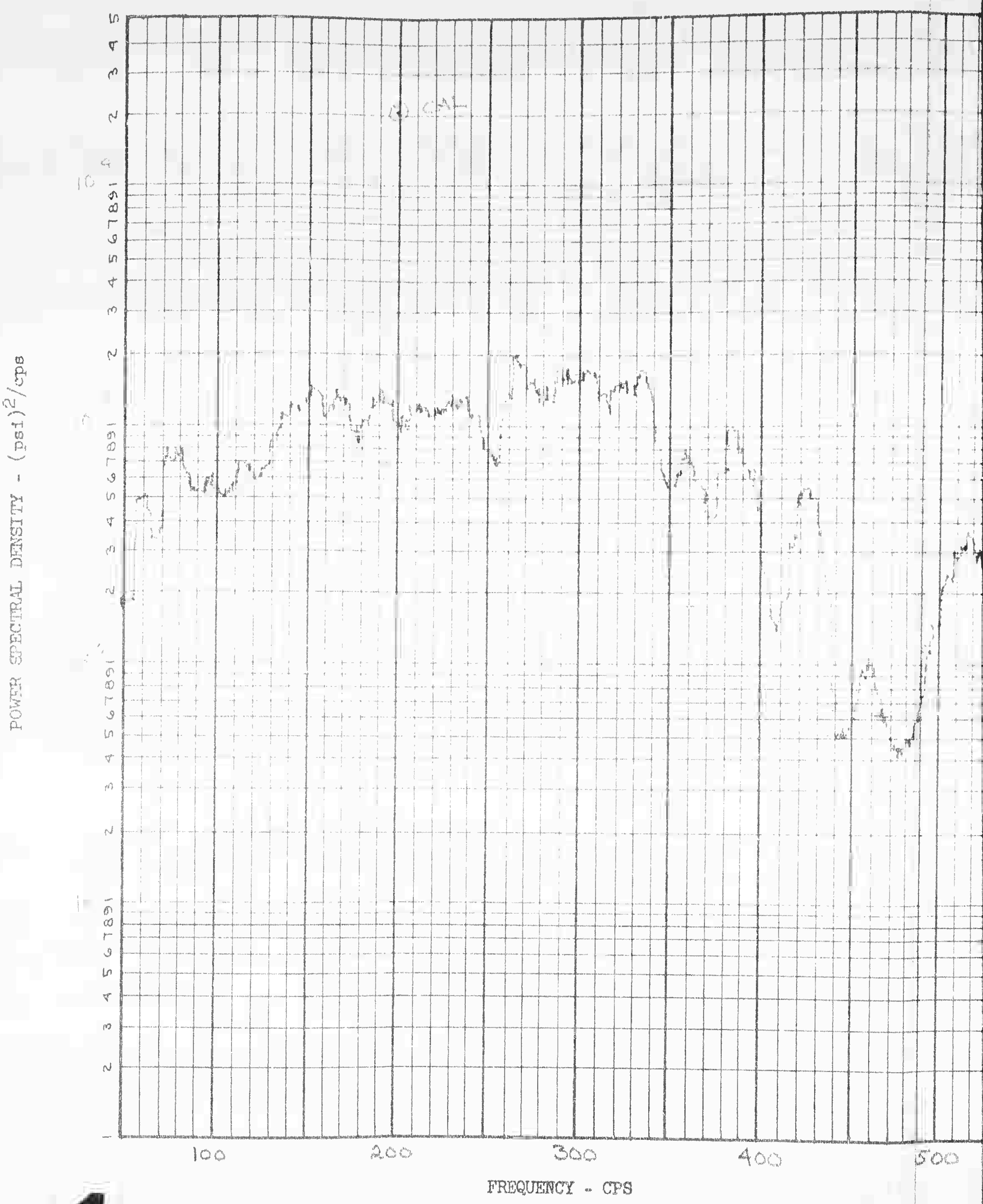
2



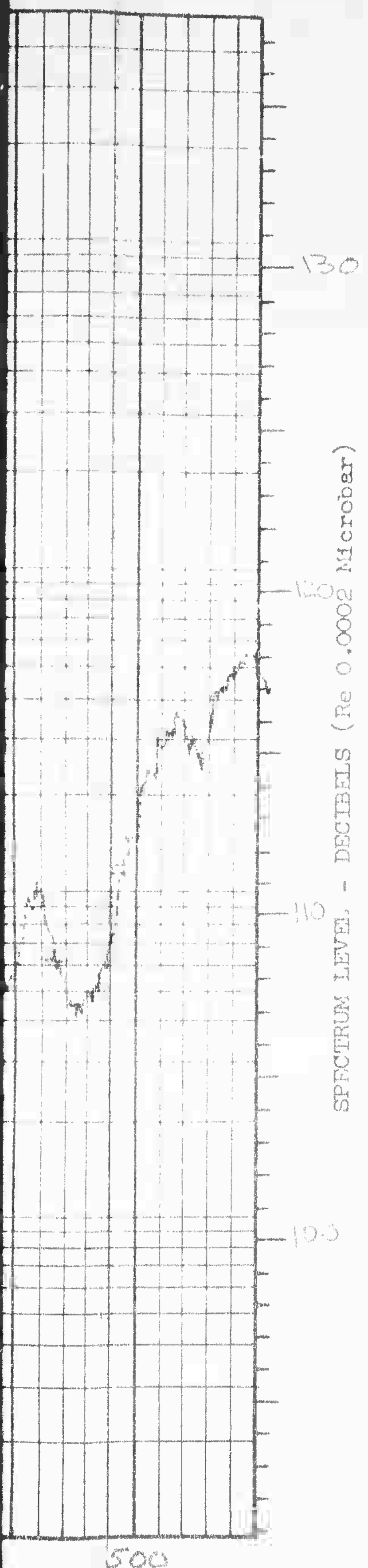
1

ANALYSIS VARIABLES

Bandwidth

5	cycles from	50	to	500	cps	T_c	15	Sec.
	cycles from		to		cps	Anal. Rate	.333	cps/Sec.
	cycles from		to		cps	Loop Length	15	Sec.

CALC.	
CHECK	
APR.	
APR.	



DATA IDENTIFICATION

Test Title PANEL ATTACHMENT - TYPE I		
EWA No. 5-593		Panel or Specimen No. 1499
Tape No. 64	Tape Channel 2	Mic. No. 2
Elapsed Test Time 60.5 MIN.		Mic. RMS Level at Sonic Lab. V_L = .250 Volts

CALIBRATION

Tape No. 64	Tape Channel 6	Data Tape RMS Volt V_R = .252

Calibration Voltage
V_a = .50 V_{rms} into Line Amp.; V_c = [illegible] V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .500

Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = 1.0

Microphone Sensitivity
S = .290 psi/Volt or 1 Volt rms = 160 db SPL

Equivalent of Calibration - psi
$P_c = V_a \cdot S = 0.145$

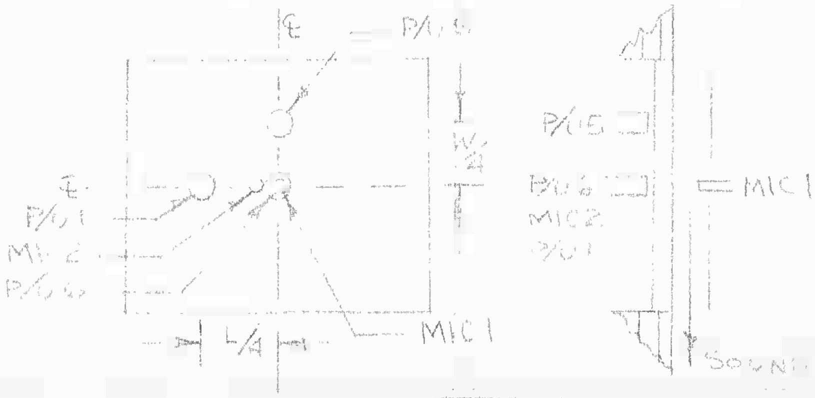
Equivalent of Calibration for PSD Plots
$$\left(\frac{P_c}{(TMG)(LG)}\right)^2 = \left[\frac{.145}{(1)(1)}\right]^2 = 2.1 \times 10^{-2} \ \text{psi}^2/\text{cps}$$

Analyzer Attenuator Setting -20 db	Log Converter Setting db

Calibration Plotted at 2.1×10^{-4} psi^2/cps

Overall Pressure Level Data	Equiv. to [illegible] db SPL

$$\text{RMS pressure level} = \frac{(P_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.145)(.252)}{(1)(1)(.500)} = [illegible] \ \text{psi}$$



2

CALC	JBT	6/20/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF MICROPHONE OUTPUT 0.5 MIN TEST MIC # 2 PANEL 1499 PHASE "D" BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
CHECK					
APR.					
APR.		6/27/61			

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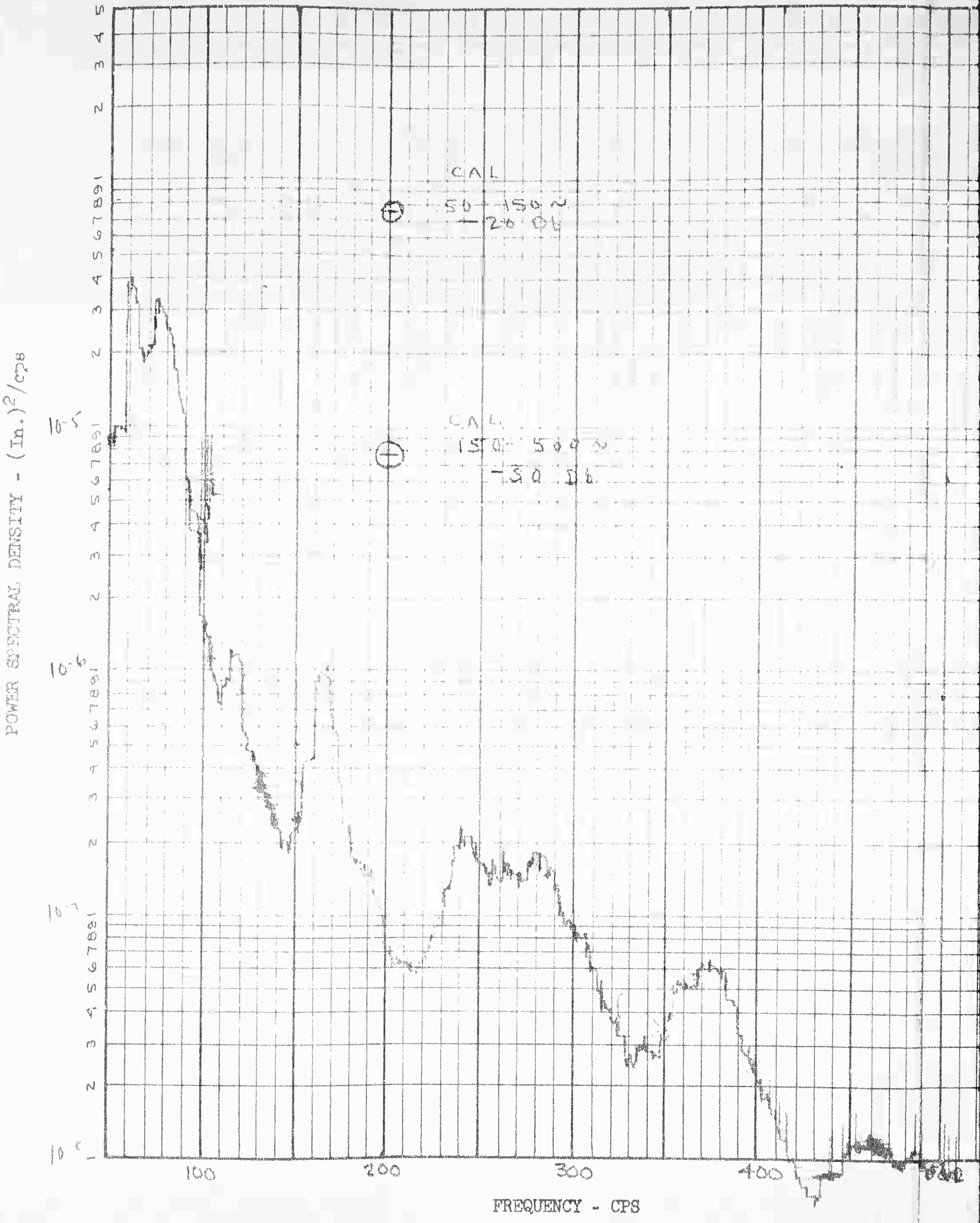


ANALYSIS VARIABLES

Bandwidth

.5 cycles from 50 to 500 cps		T_c 15 Sec.
___ cycles from ___ to ___ cps		Anal. Rate .333 cps/sec.
___ cycles from ___ to ___ cps		Loop Length 15 Sec.

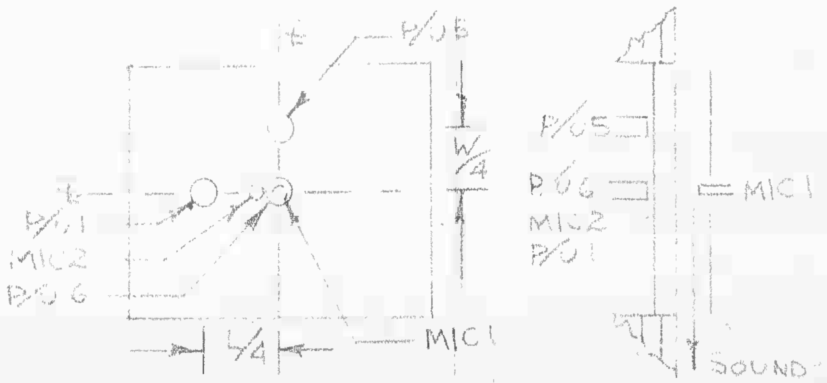
CALC	CB
CHECK	
APR.	
APR.	
	S.A

DATA IDENTIFICATION

Test Title: PANEL ATTACHMENT – TYPE I		
EWA No. 5-573	Panel or Specimen No. 1499	
Tape No. 64	Tape Channel 3	Displacement Pickup # 1
Elapsed Test Time 60.5 MIN.	P/U RMS Level at Sonic Lab. V_L = 1.05 Volts	

CALIBRATION

Tape No. 64	Tape Channel 6	Data Tape RMS Volt V_R = .175
Calibration Voltage: V_a = .50 V_{rms} into Line Amp.; V_c = .48 V_{rms} on Tape @ 200 cps		
Line Amplifier Settings: For Calibration G_c = .500 ; for Data G_d = .100		
Lab. Gain LG = 1.0	Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .2	
Displacement Pickup Sensitivity S = .035 in./Volt		
Equivalent of Calibration - in. $D_c = V_a \cdot S$ = .0175		
Equivalent of Calibration for PSD Plots $\left(\frac{D_c}{(TMG)(LG)}\right)^2 = \left[\frac{.0175}{(.2)(1)}\right]^2 = 7.65 \times 10^{-3}$ in.^{2}/cps		
Analyzer Attenuator Setting -20 / -25 db [illegible]	Log Converter Setting 0 db	
Calibration Plotted at 7.65 (10^{-3}) in.^{2}/cps		
Overall Deflection Level of Data: RMS Defl. Level $= \frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0175)(.175)}{(.2)(1)(.48)}$ = .0319 in.		



CALC	CBT	6/30/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 162.5 db 0.5 MIN TEST P/U #1 PANEL 1499 PHASE "D"
CHECK					BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
APR.					Vol. I
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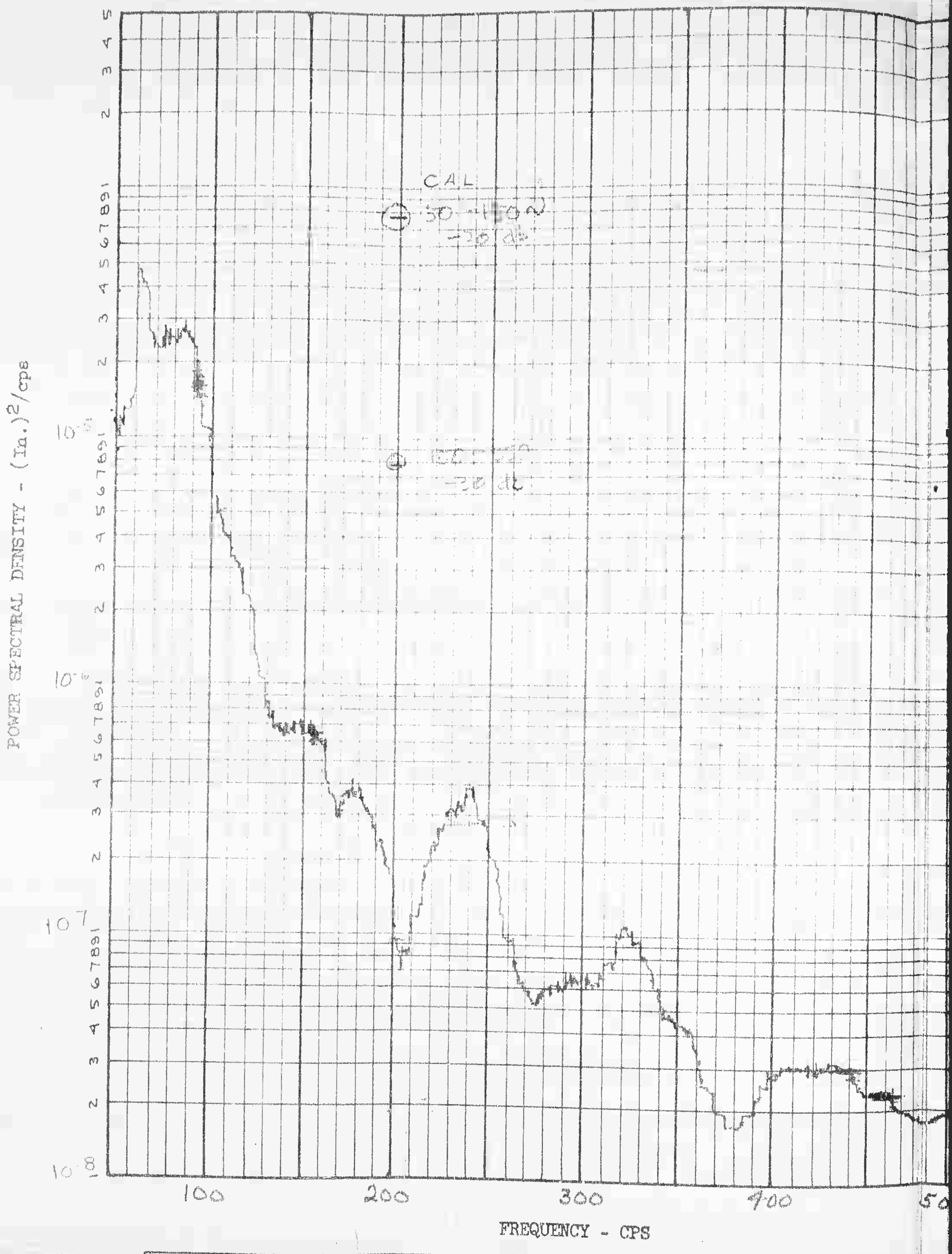
2



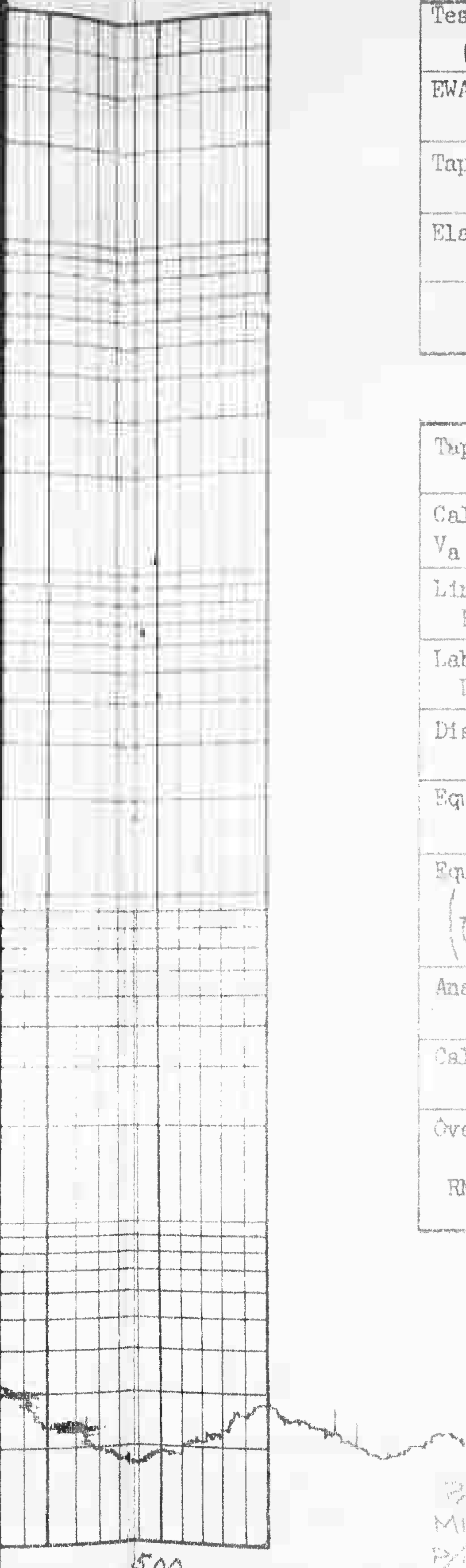
1

ANALYSIS VARIABLES

Bandwidth

5 cycles from 50 to 500 cps — T_c 15 Sec.
___ cycles from ___ to ___ cps — Anal. Rate .333 cps/sec.
___ cycles from ___ to ___ cps — Loop Length 15 Sec.

CALC
CHECK
APR.
APR.



DATA IDENTIFICATION

Test Title PANEL ATTACHMENT - TYPE I	
EWA No. 5-593	Panel or Specimen No. 1499

Tape No. 64	Tape Channel 4	Displacement Pickup # 5

Elapsed Test Time 60.5 MIN	P/U RMS Level at Sonic Lab. V_L = 1.00 Volts

CALIBRATION

Tape No. 64	Tape Channel 6	Data Tape RMS Volt V_R = .190

Calibration Voltage
V_a = .50 V_{rms} into Line Amp.; V_c = .48 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .100

Lab. Gain
LG = 1.0

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .2

Displacement Pickup Sensitivity
S = .035 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = 0.0175

Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2$ = 7.65×10^{-3} in.^{2}/cps

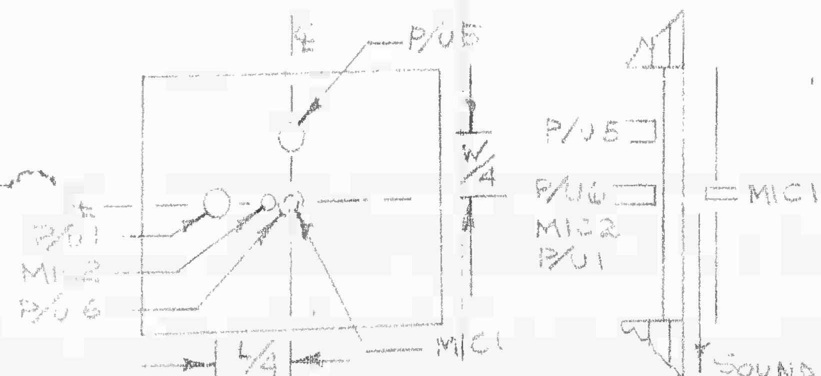
Analyzer Attenuator Setting -20 50-650 ~ / -32 650-1560 ~ db

Log Converter Setting 0 db

Calibration Plotted at
7.65 (10^{-3}) in.^{2}/cps

Overall Deflection Level of Data

RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0175)(.190)}{(.2)(1)(.48)}$ = .0346 in.



2

CALC	CBT	6/30/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 162.5 db 2.5 MIN TEST
CHECK					P/U # 5 PANEL 1499 PHASE "D"
APR.					BOEING AIRPLANE COMPANY
APR.	SA	6/28/61			SEATTLE 24, WASHINGTON

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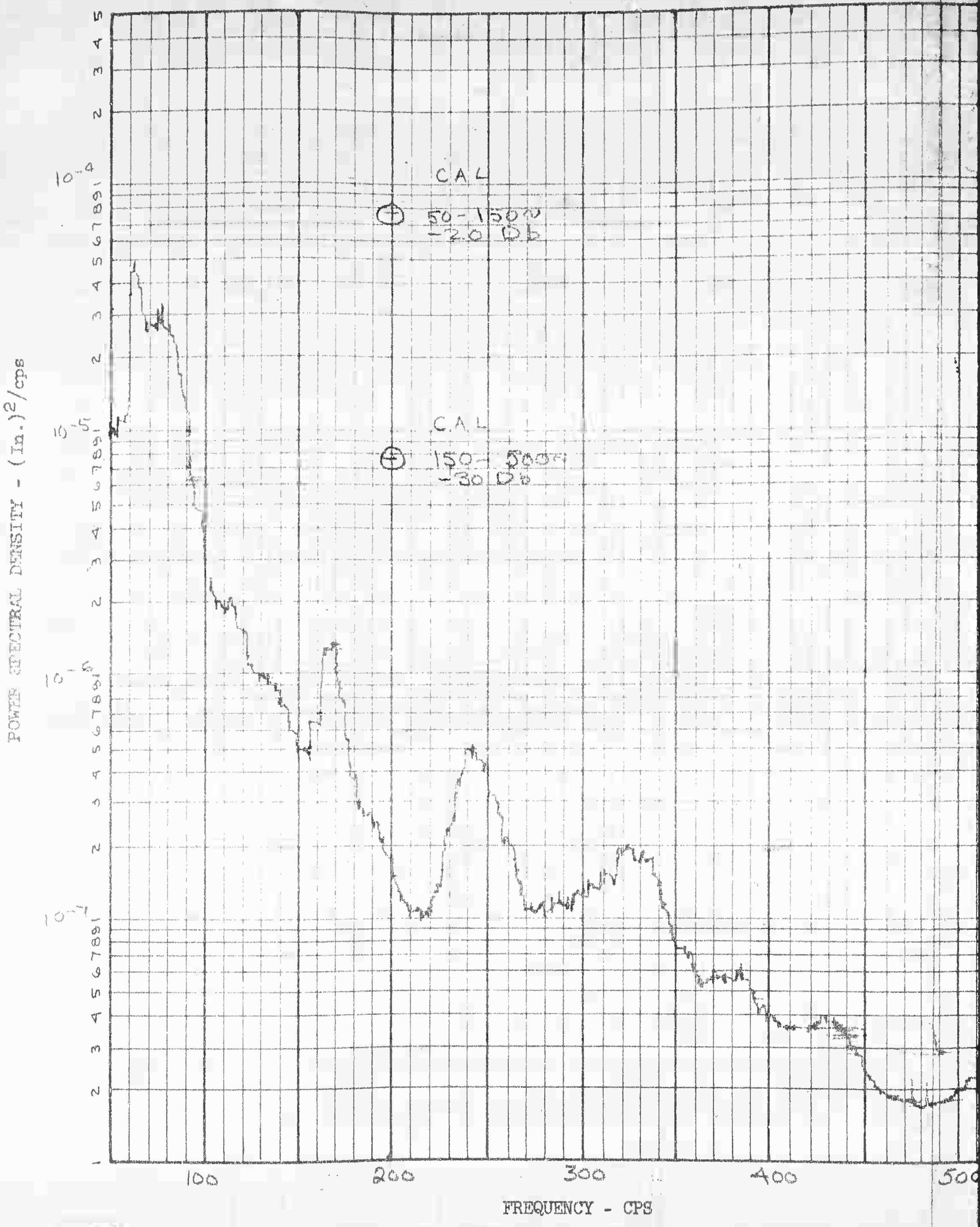
2-5353-7-9



1

ANALYSIS VARIABLES

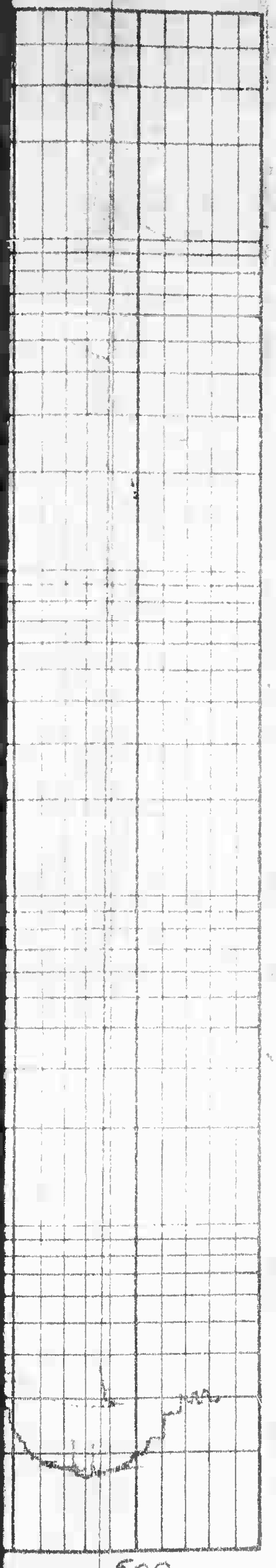
Bandwidth

5 cycles from 50 to 500 cps T_c 15 Sec.

___ cycles from ___ to ___ cps Anal. Rate .333 cps/sec.

___ cycles from ___ to ___ cps Loop Length 15 Sec.

CALC	
CHECK	
APR.	
APR.	



DATA IDENTIFICATION

Test Title PANEL ATTACHMENT – TYPE I	
EWA No. 5-593	Panel or Specimen No. 1499

Tape No. 64	Tape Channel 5	Displacement Pickup # 6

Elapsed Test Time 60.5 MIN.	P/U RMS Level at Sonic Lab. V_L = .900 Volts

CALIBRATION

Tape No. 64	Tape Channel 6	Data Tape RMS Volt V_R = .180

Calibration Voltage
V_a = .50 V_{rms} into Line Amp.; V_c = .48 V_{rms} on Tape @ 200 cps

Line Amplifier Settings
For Calibration G_c = .500 ; for Data G_d = .100

Lab. Gain
LG = 1.0

Tape Monitor Gain $TMG = \frac{G_d}{G_c}$ = .20

Displacement Pickup Sensitivity
S = .035 in./Volt

Equivalent of Calibration - in.
$D_c = V_a \cdot S$ = .0175

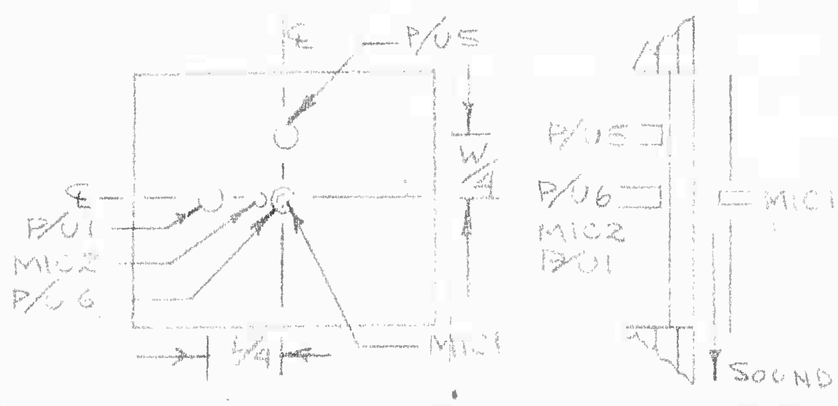
Equivalent of Calibration for PSD Plots
$\left(\frac{D_c}{(TMG)(LG)}\right)^2 = 7.65 \times 10^{-3}$ in.^{2}/cps

Analyzer Attenuator Setting −20 / −30 db   Log Converter Setting 0 db

Calibration Plotted at
7.65 (10^{-3}) in.^{2}/cps

Overall Deflection Level of Data

RMS Defl. Level = $\frac{(D_c)(V_R)}{(TMG)(LG)(V_c)} = \frac{(.0175)(.90)}{(.2)(1)(.48)}$ = .0328 in.



CALC	CBT	6/30/61	REVISED	DATE	POWER SPECTRAL DENSITY ANALYSIS OF DISPLACEMENT PICKUP 161.8 db P/U #6 0.5 MIN TEST PHASE "D" BOEING AIRPLANE COMPANY SEATTLE 24, WASHINGTON
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APR.					PAGE
	SA	6/30/61			FIG. 222

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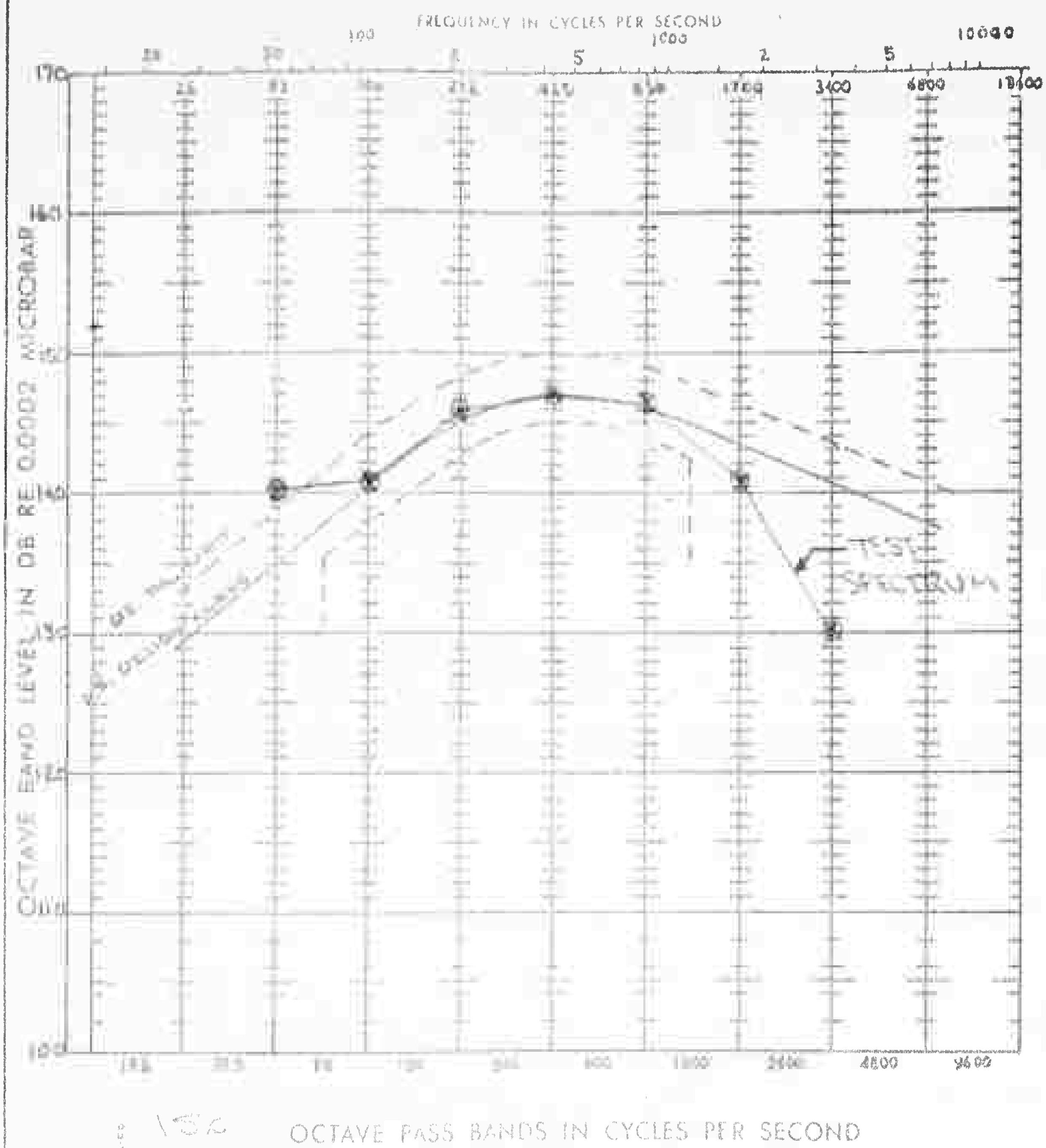
2

EWA 5-593



EQUILIZER SETTINGS	
20 - 75	20.5
75 - 150	24.0
150 - 300	11.0
300 - 600	7.0
600 - 1200	3
1200 - 2400	-1.0
2400 - 4800	∞
4800 - 9600	∞

3 AMPS 28 PSI

PANEL 1493
EWA 5-593
MIKE # 1

CALC
DATE
BOEING
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EWA 5-593

EQUILIZER SETTINGS	
20 - 75	20.5
75 - 150	24.0
150 - 300	17.0
300 - 600	7.0
600 - 1200	3.0
1200 - 2400	-1.0
2400 - 4800	∞
4800 - 9600	∞

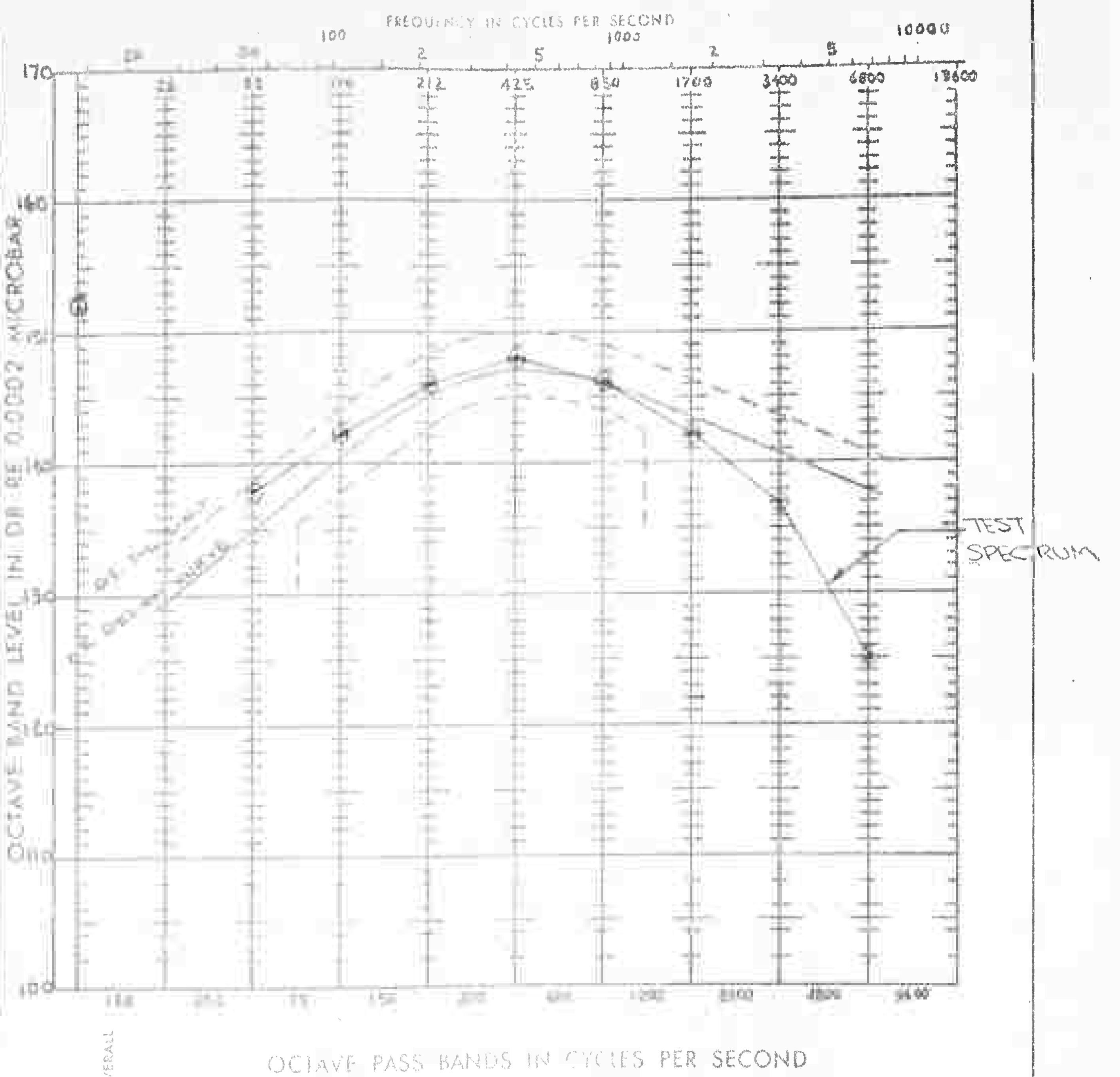
3.2 AMPS 35 PSI

PANEL 1494
MIC. # 1 (INSIDE HORN)

CALC A.B. DATE 5/4/61 Vol. I

BOEING NO D2-80084

SONIC LAB. PAGE FIG 22.4



EQUILIZER SETTINGS	
20 - 75	[illegible]
75 - 150	[illegible]
150 - 300	[illegible]
300 - 600	7.0
600 - 1200	[illegible]
1200 - 2400	[illegible]
2400 - 4800	[illegible]
4800 - 9600	00

3.2 AMPS 25 PSI

CALC A.B. DATE 5/8/61 VOL I

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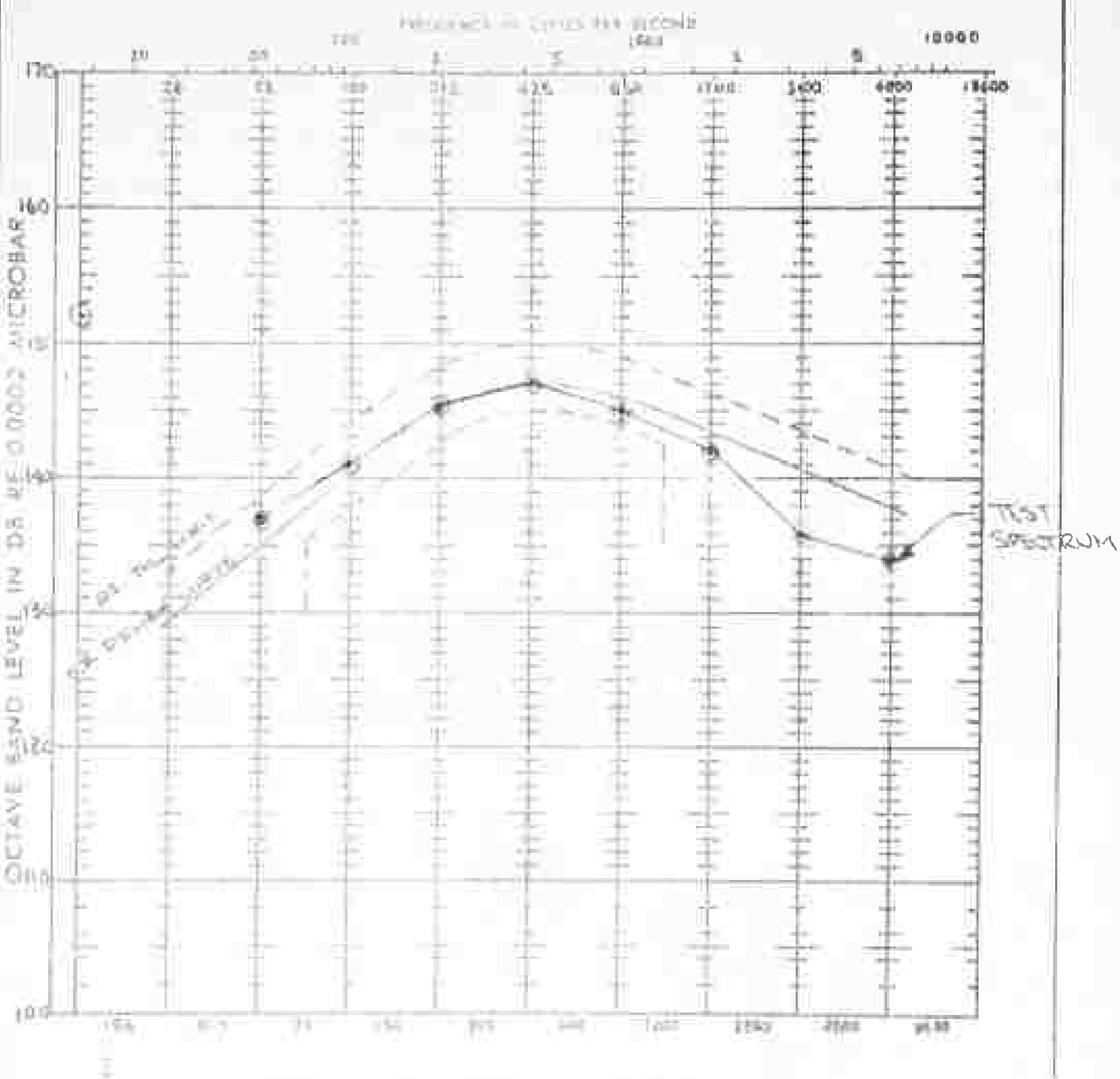
SONIC LAB. PAGE FIG 225.

EWA 5-573



EQUILIZER SETTINGS	
20 - 75	26.5
75 - 150	21.0
150 - 300	17.0
300 - 600	7.0
600 - 1200	-1.0
1200 - 2400	-1.0
2400 - 4800	00
4800 - 9600	0

3.0 AMPS 35 PSI

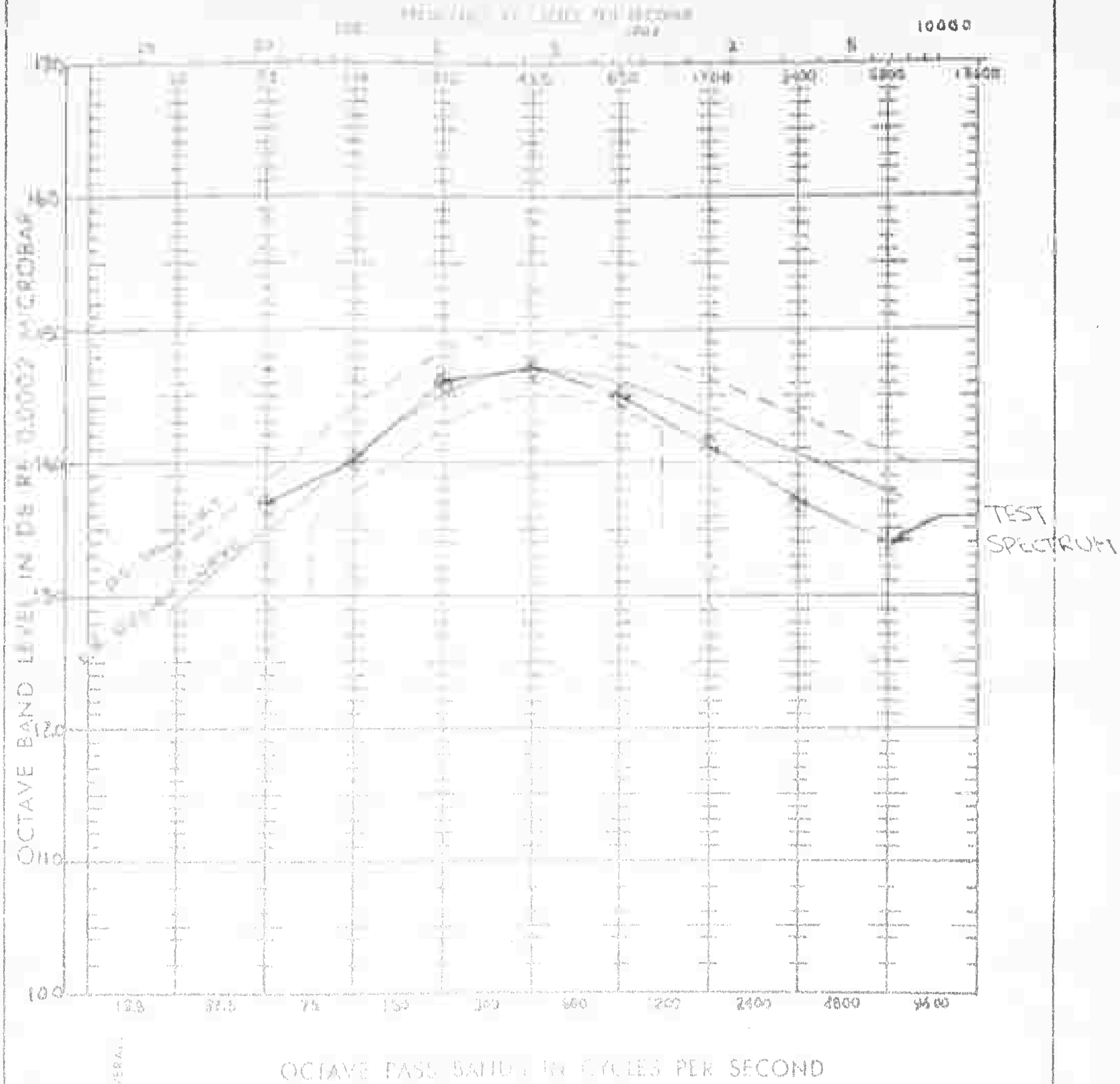
MIC. #1

PANEL 14-17

CALC A.B. DATE 5/9/61

BOEING NO D2-80084 Vol. I

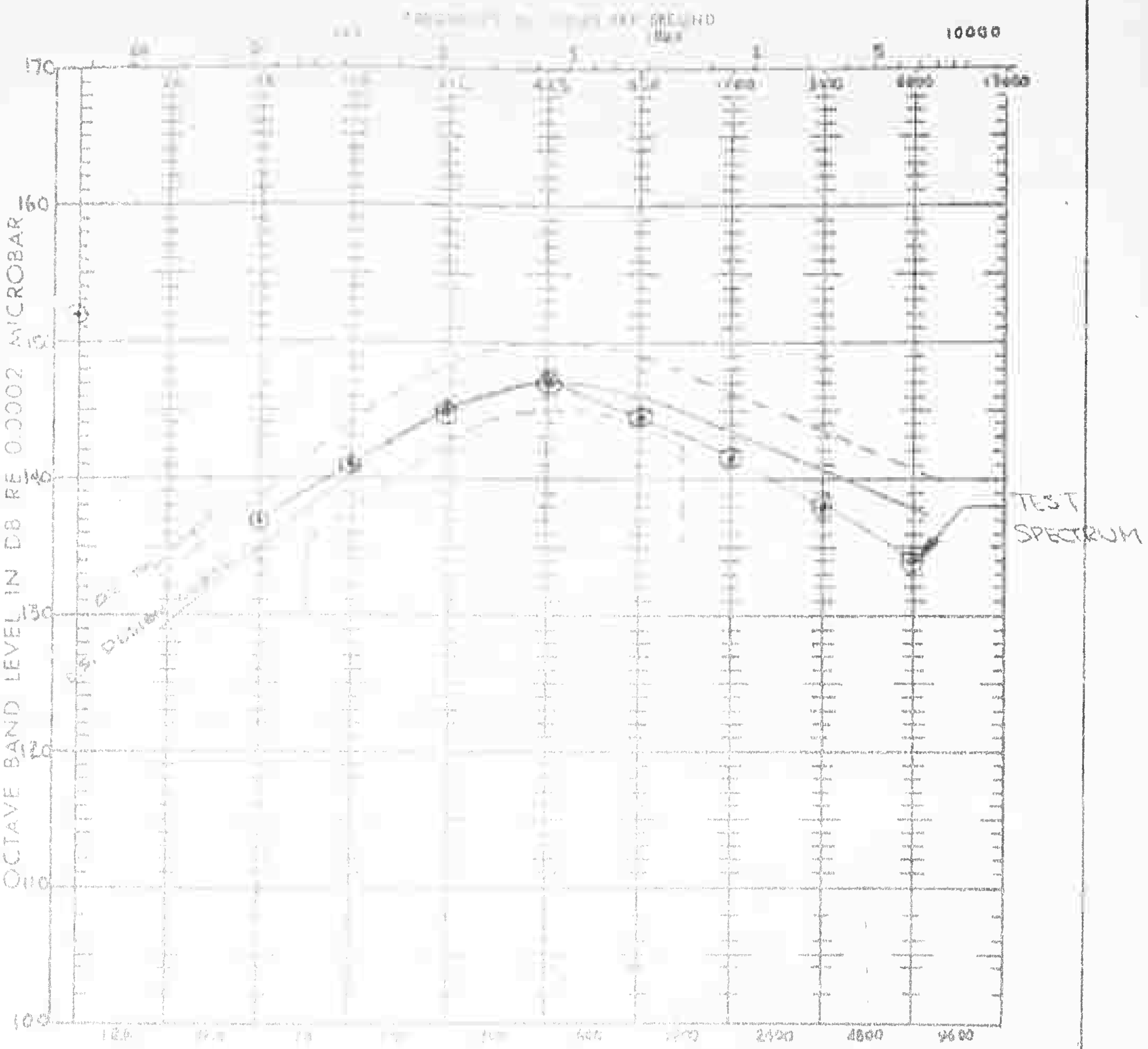
SONIC LAB. PAGE FIG 22.6



EQUILIZER SETTINGS

20 - 75	[illegible]
75 - 150	[illegible]
150 - 300	[illegible]
300 - 600	[illegible]
600 - 1200	[illegible]
1200 - 2400	[illegible]
2400 - 4800	[illegible]
4800 - 9600	[illegible]

3 AMPS 40 PSI



PER SECOND

EQUILIZER SETTINGS	
20 - 75	[illegible]
75 - 150	[illegible]
150 - 300	[illegible]
300 - 600	7.0
600 - 1200	-7.0
1200 - 2400	[illegible]
2400 - 4800	
4800 - 9600	[illegible]

3.2 AMPS 35 PSI

CALC A.F. DATE 5/10/61 Vol I

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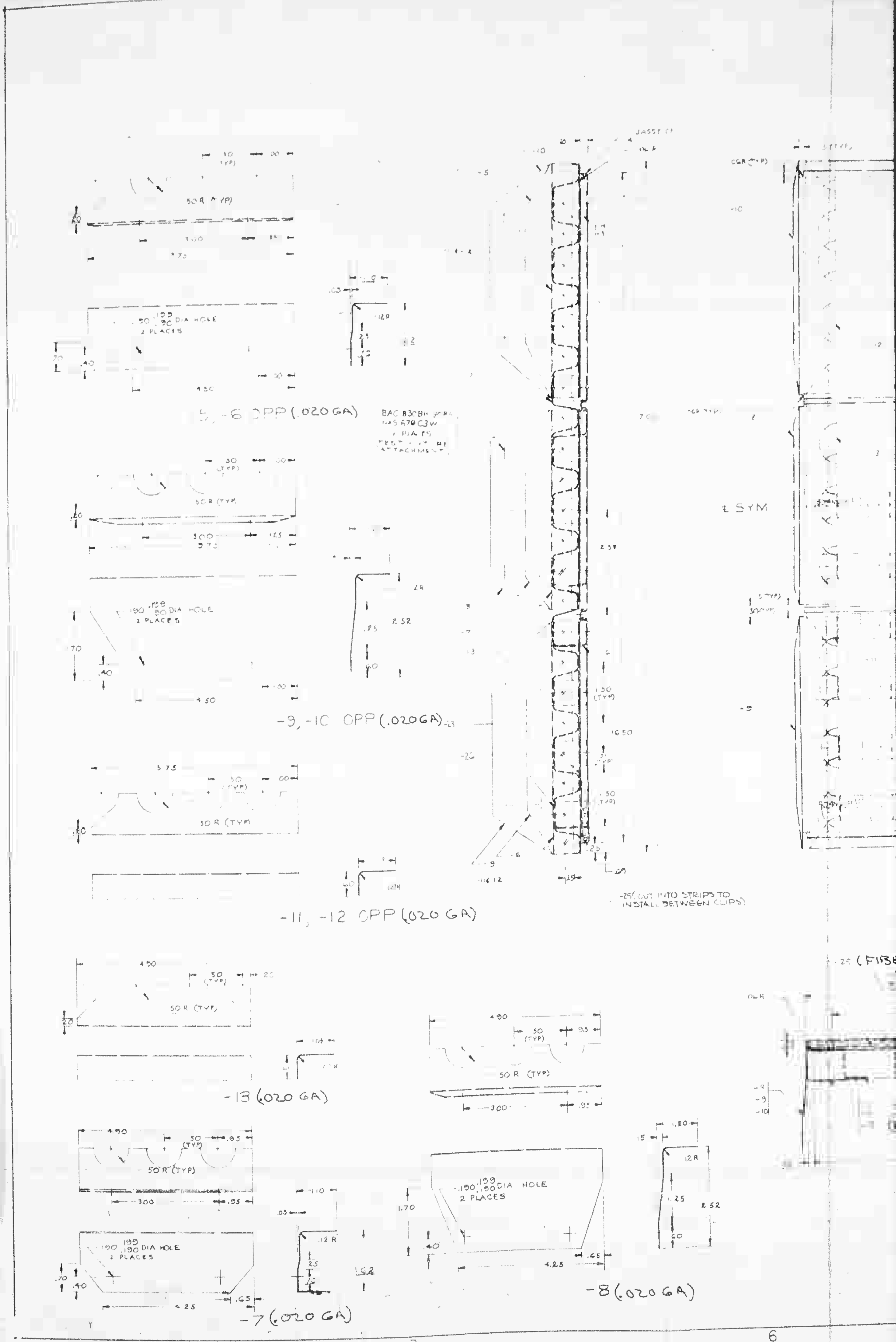
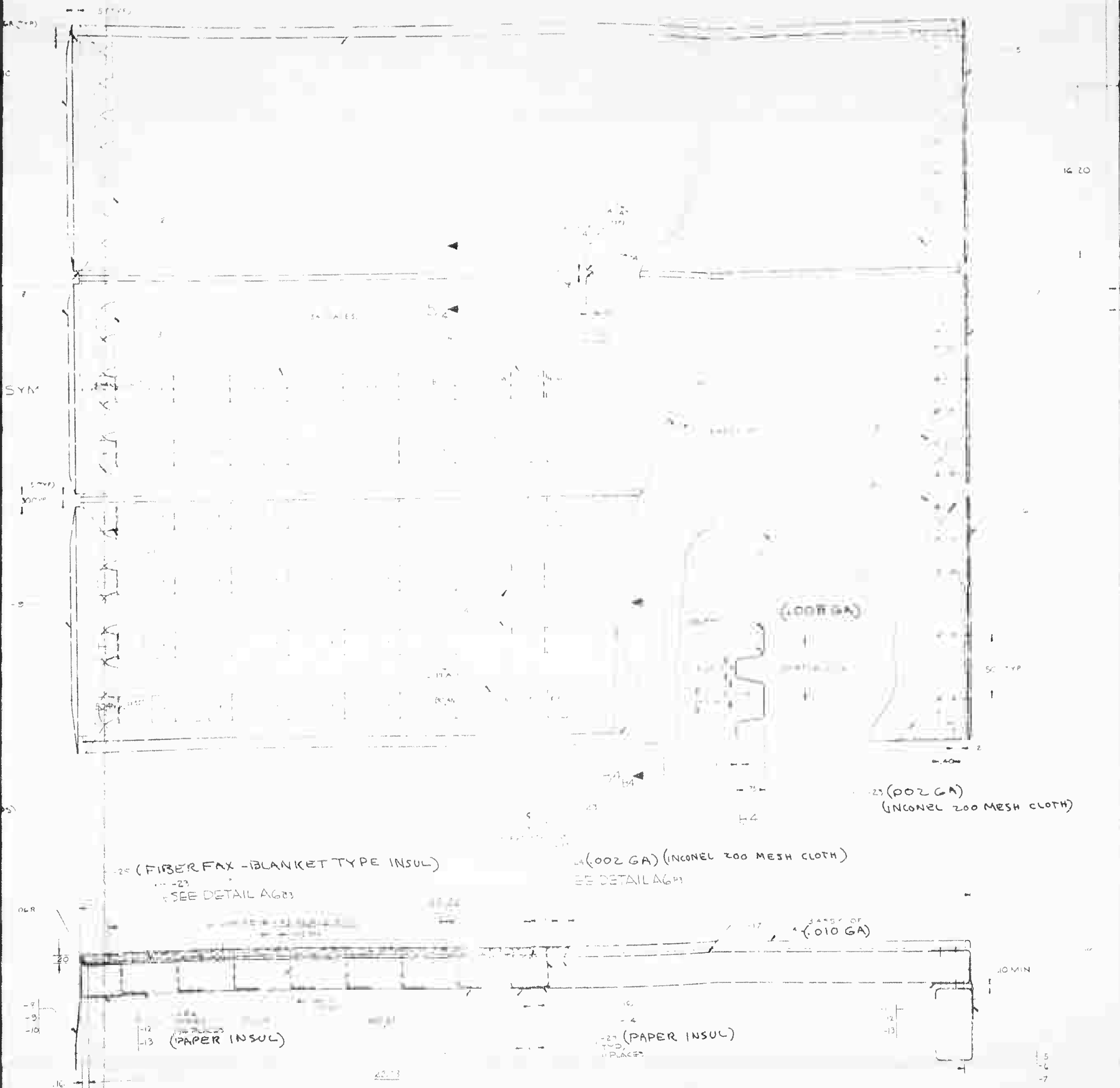
SONIC LAB. PAGE Fig 22B

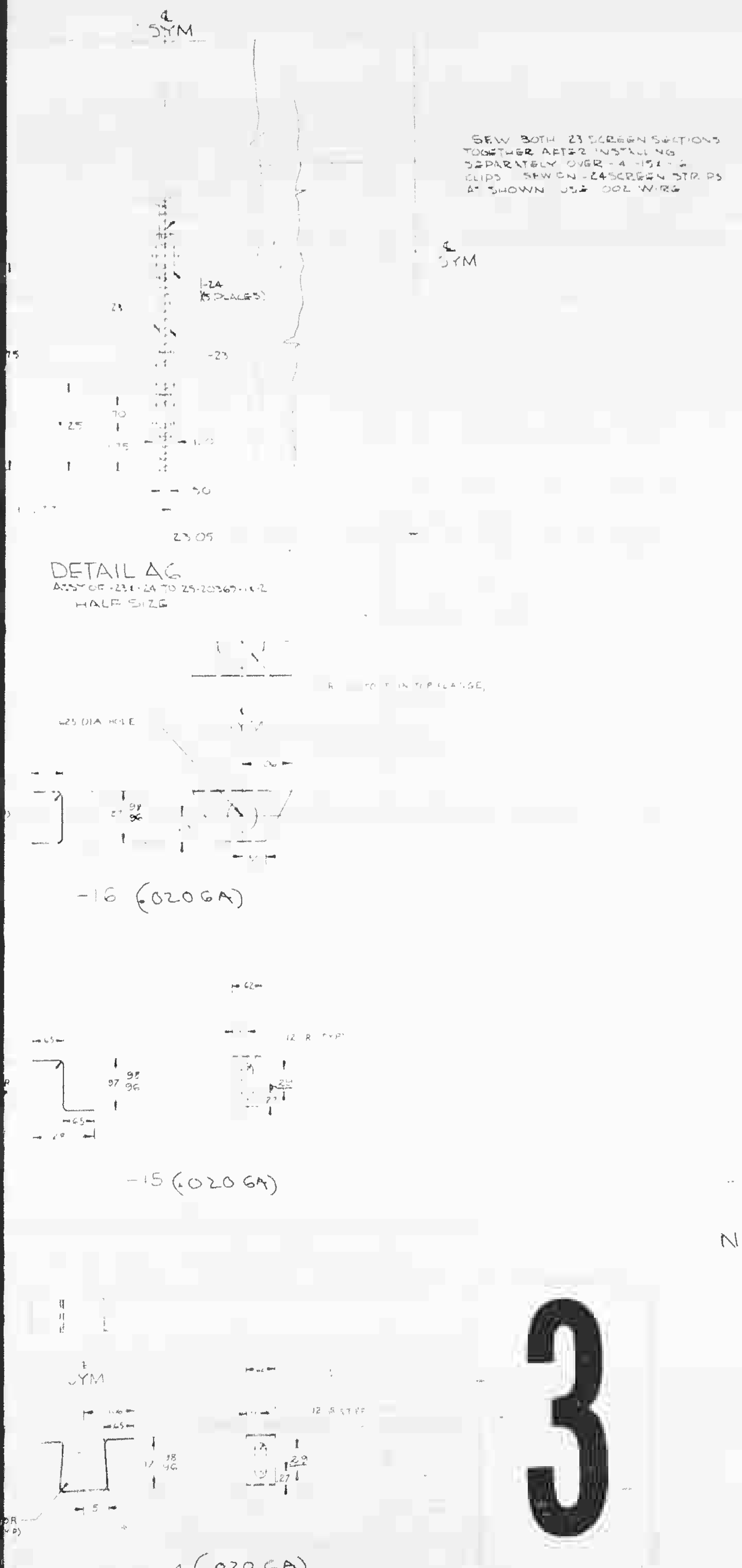

-5, -6 OPP (.020 GA)
-9, -10 OPP (.020 GA)
-11, -12 OPP (.020 GA)
-13 (.020 GA)
-7 (.020 GA)
-8 (.020 GA)
.50 R (TYP)
.199
.190 DIA HOLE
2 PLACES
BAC B30BH
NAS 678 C3W
TEST FIT AT ATTACHMENT
℄ SYM
16.50
2.52
4.25
4.50
3.00
-25 (CUT INTO STRIPS TO INSTALL BETWEEN CLIPS)
7
6

1



PANEL A... OF 25-20369-1

2



NOTE: ALL PARTS FABRICATED FROM RENE' 41 EXCEPT AS NOTED.

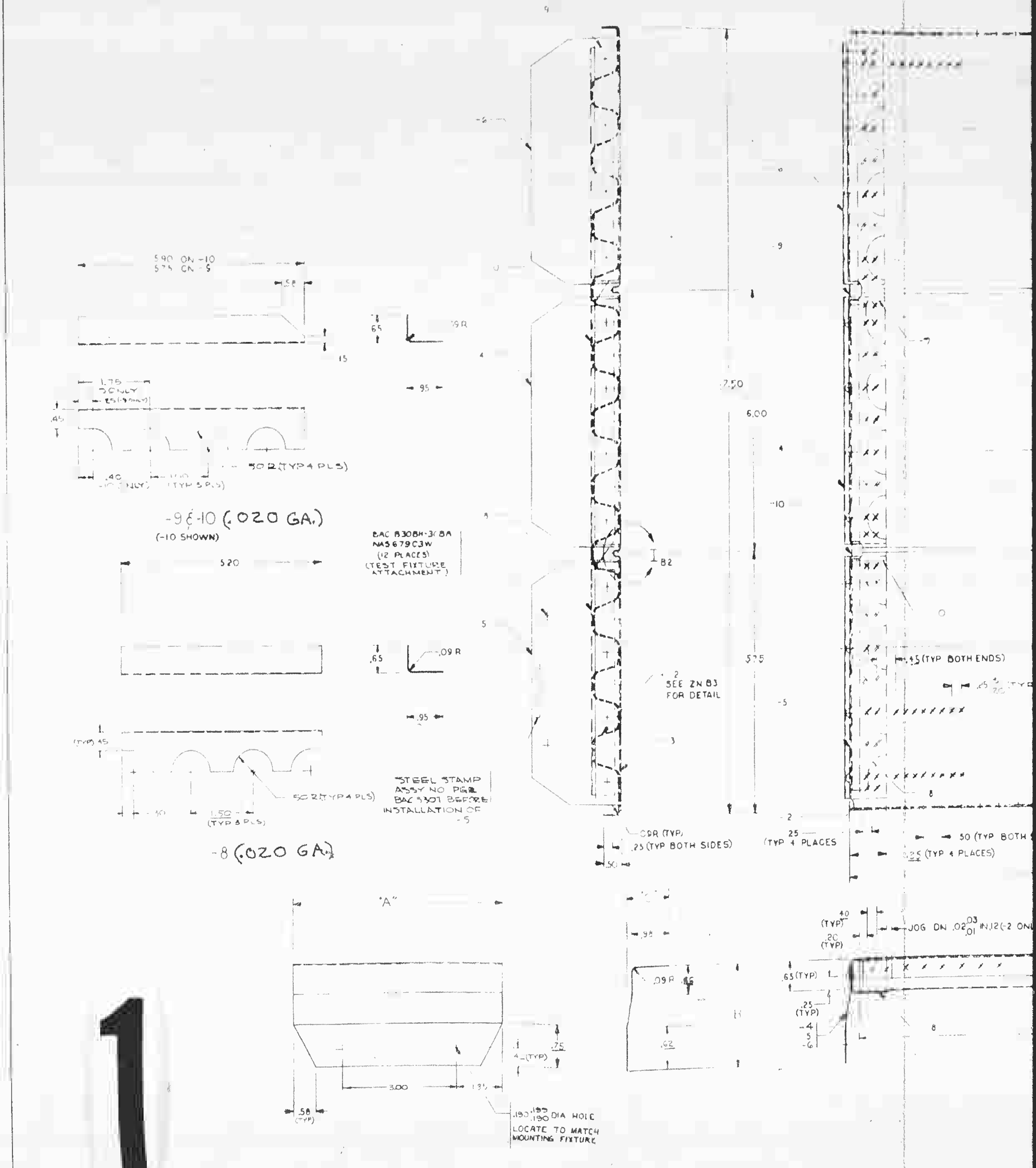
3

SEE SHEET 1 FOR LIST OF MATERIAL AND NOTES

USED ON	DRAWN B. SCHMIDT	DATE	PANEL - SONIC TEST, ASSEMBLY OF (TEST ONLY)	BOEING AIRPLANE CO AERO-SPACE DIV SEATTLE 24 WASH
TEST	CHECKED			25-20369
	ENGR		SCALE	CODE 81205 SH 2
SECT NO	GROUP APPD			

CHANGE NO FWA 5-593 | DYNA SOAR AIRFRAME WING & CONTROL SURFACE

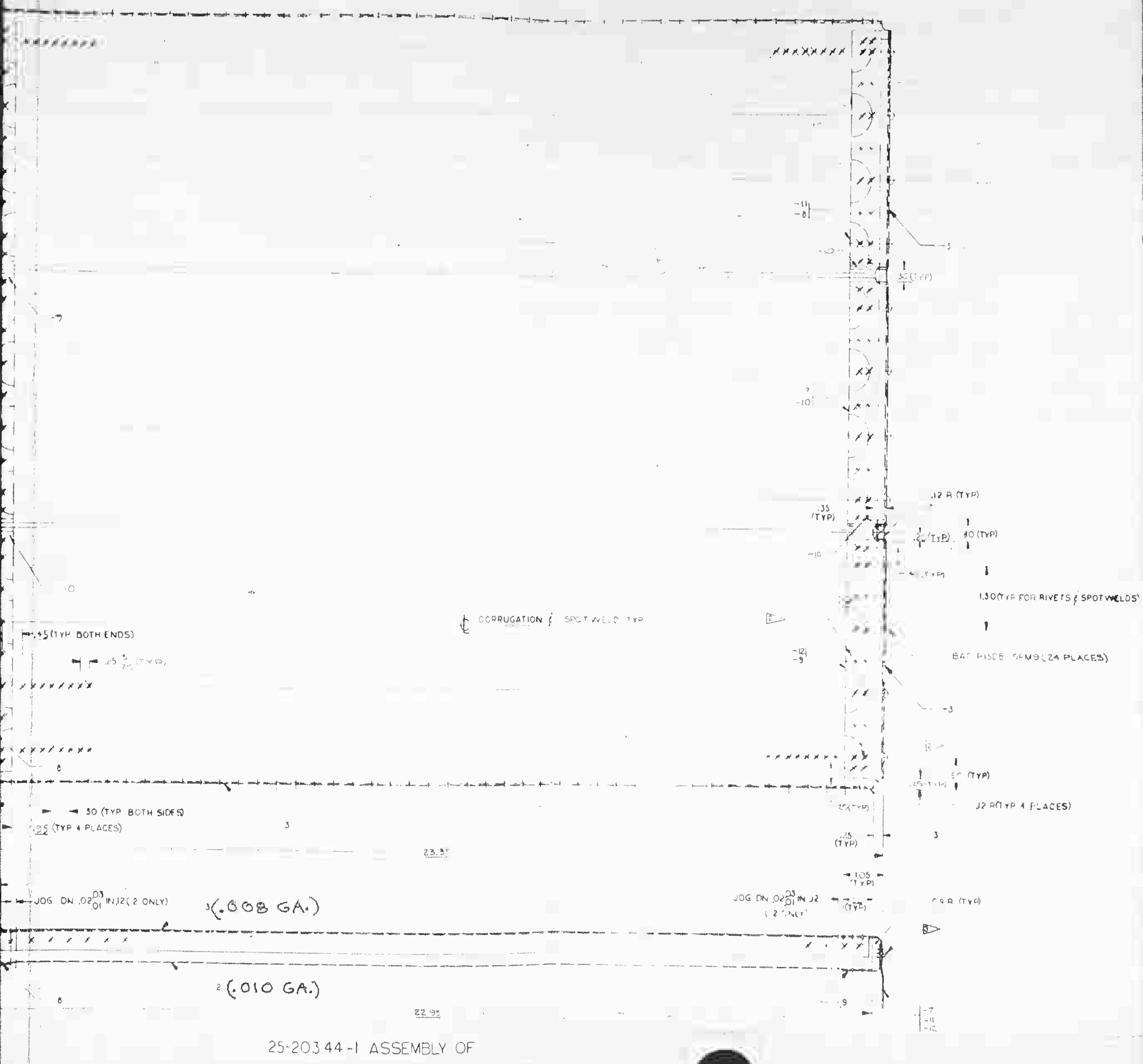
FIG. 229



-4, -5 & -6 OPP; -7, -11 & -12 OPP (.020 GA. TYP.)

PART NUMBER	"A"	"B"	"C"
-4	5.70	2.53	1.13
-5 & -6 OPP	5.45	2.53	1.13
-7	5.70	1.68	1.03
-11 & -12 OPP	5.45	1.68	1.03

7 6


.12 R (TYP)
.35 (TYP)
.40 (TYP)
1.30 (TYP FOR RIVETS & SPOTWELDS)
CORRUGATION & SPOTWELDS TYP
.45 (TYP BOTH ENDS)
.30 (TYP BOTH SIDES)
.25 (TYP 4 PLACES)
.12 R (TYP 4 PLACES)
23.35
1.05 (TYP)
JOG DN .02 IN .12 (2 ONLY)
3 (.008 GA.)
2 (.010 GA.)
22.95
25-20344-1 ASSEMBLY OF

2

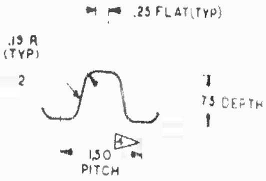
REVISION				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL

NOTE: ALL PARTS FABRICATED FROM RENE' 41.

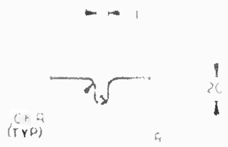
F FOR RIVETS & SPOTWELDS)

5FM9 (24 PLACES)

4 PLACES)



TYPICAL CORRUGATION SECTION



TWICE SIZE

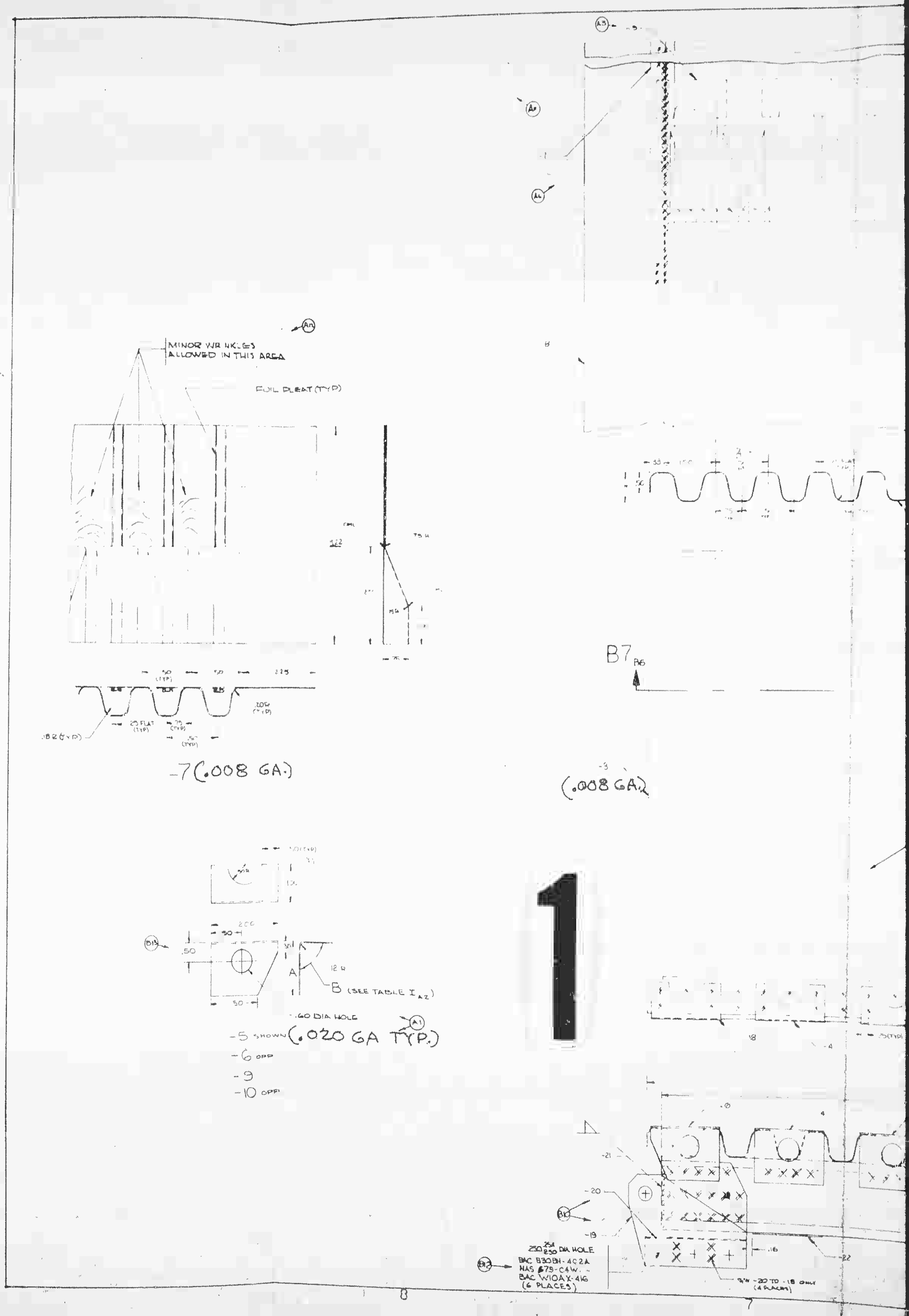
DETAIL I

(TYP TWO PLACES)

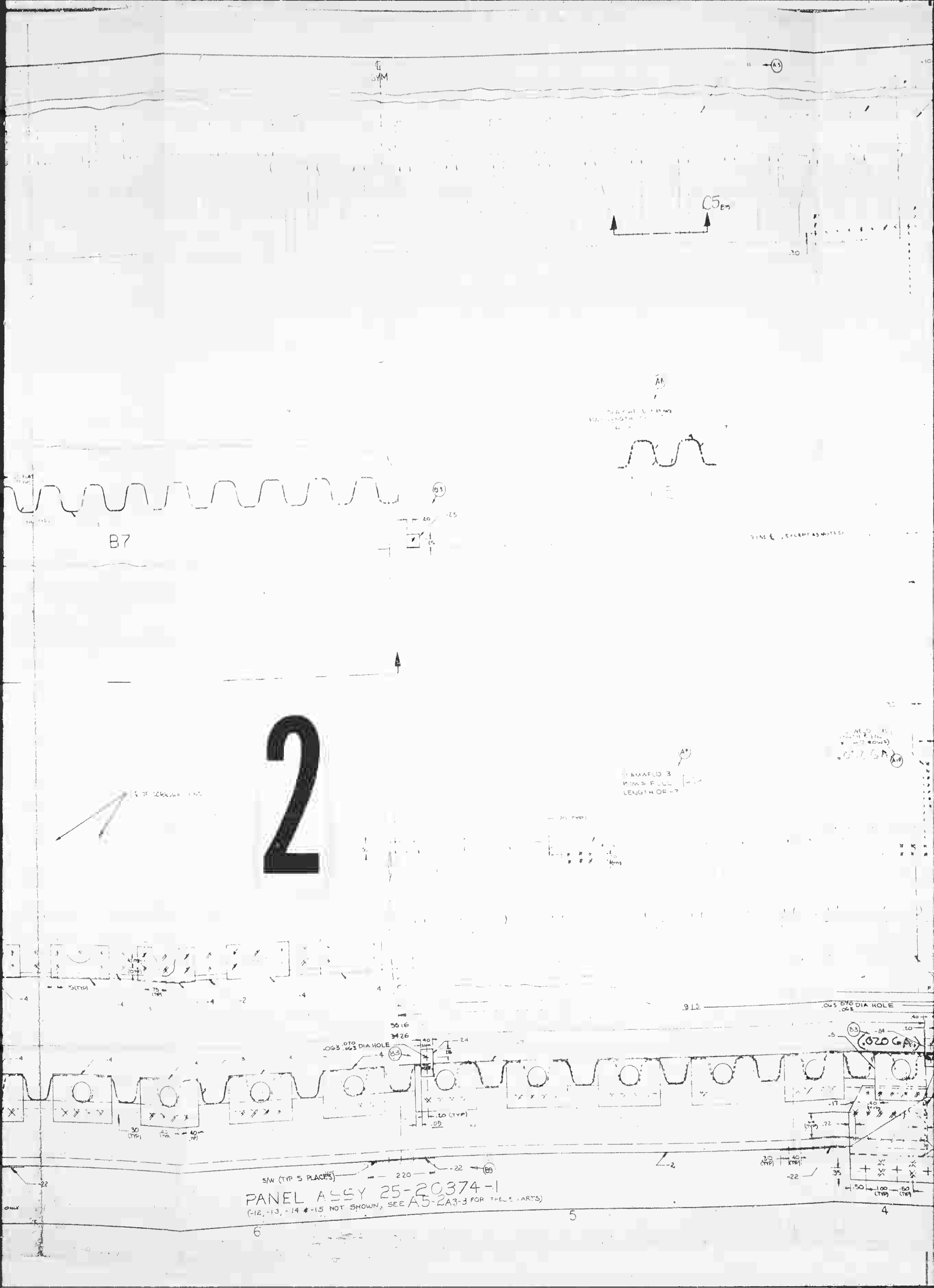
SEE SHEET 1 FOR LIST OF MATERIAL AND NOTES

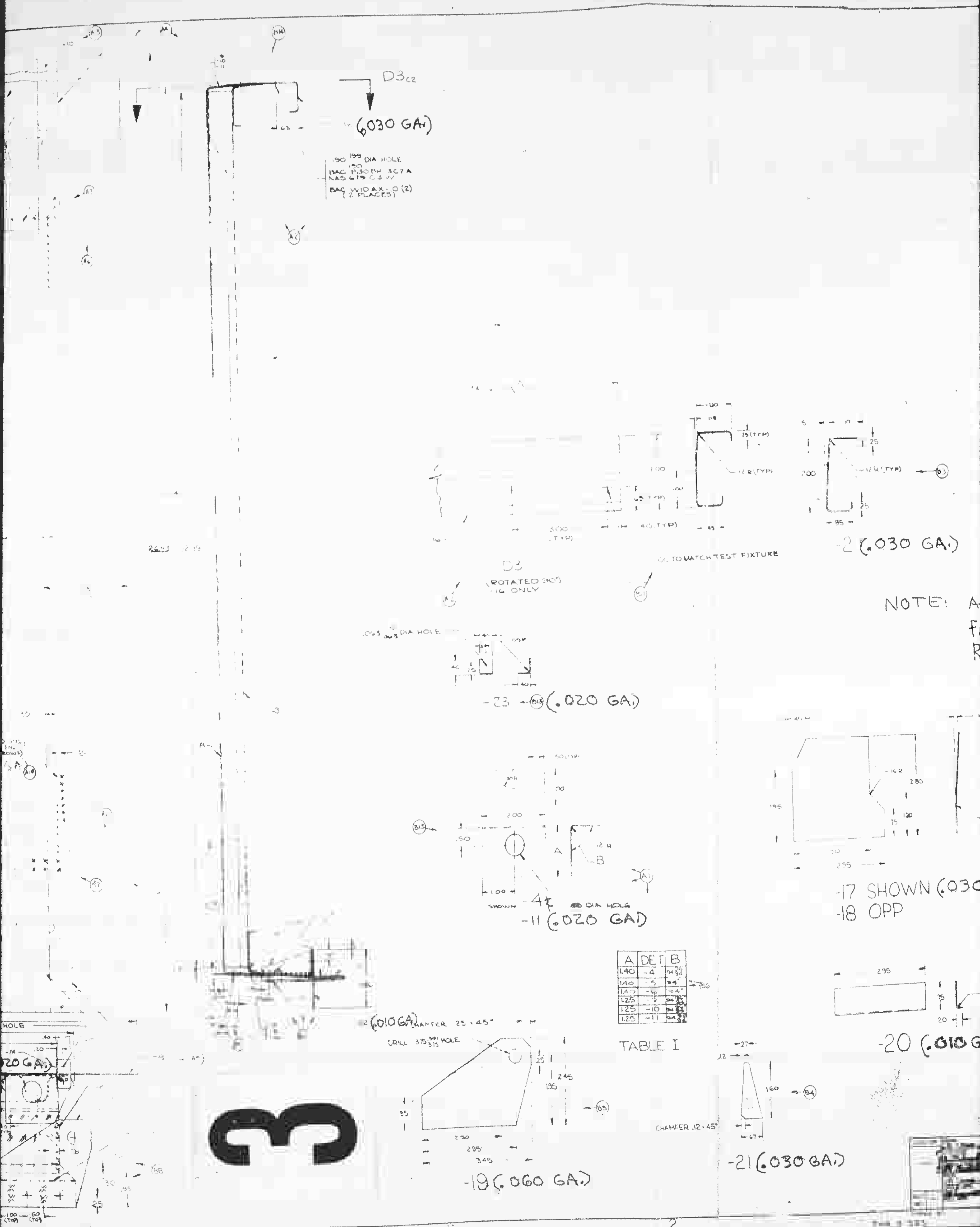
USED ON	DRAWN WEMETT	9/2/60	PANEL-ASSEMBLY OF, SONIC TEST (TEST ONLY)	BOEING AIRPLANE CO AERO-SPACE DIV SEATTLE 24 WASH
	CHECKED L. ESCOLERO			
	GROUP APPD			25-20344
SECT NO —	PROJ APPD		SCALE FULL & NOTED	CODE / SH 2 OF 2
CHANGE NO EWA S-593			DYNASOAR AIRFRAME - WING AND CONTROL SURFACES	

FIG. 230



MINOR WRINKLES ALLOWED IN THIS AREA
FOIL PLEAT (TYP)
-7 (.008 GA.)
-3
(.008 GA.)
B7
B6
12 R
B (SEE TABLE I A2)
.60 DIA HOLE
-5 SHOWN (.020 GA TYP.)
-6 OPP
-9
-10 OPP
1
BAC B30BN-4C2A
NAS 679-C4W
BAC W10AX-416
(6 PLACES)
8
7


SYM
C5
B7
2
.063 .070/.063 DIA HOLE
(.020 GA)
.065 .070/.063 DIA HOLE
S/W (TYP 5 PLACES)
2.20
-22
PANEL ASSY 25-20374-1
(-12, -13, -14 & -15 NOT SHOWN, SEE A5-2A3-3 FOR THESE PARTS)
6
5
4



A	DET	B
1.40	-4	[illegible]
1.40	-5	[illegible]
1.40	-6	[illegible]
1.25	-9	[illegible]
1.25	-10	[illegible]
1.25	-11	[illegible]

TABLE I

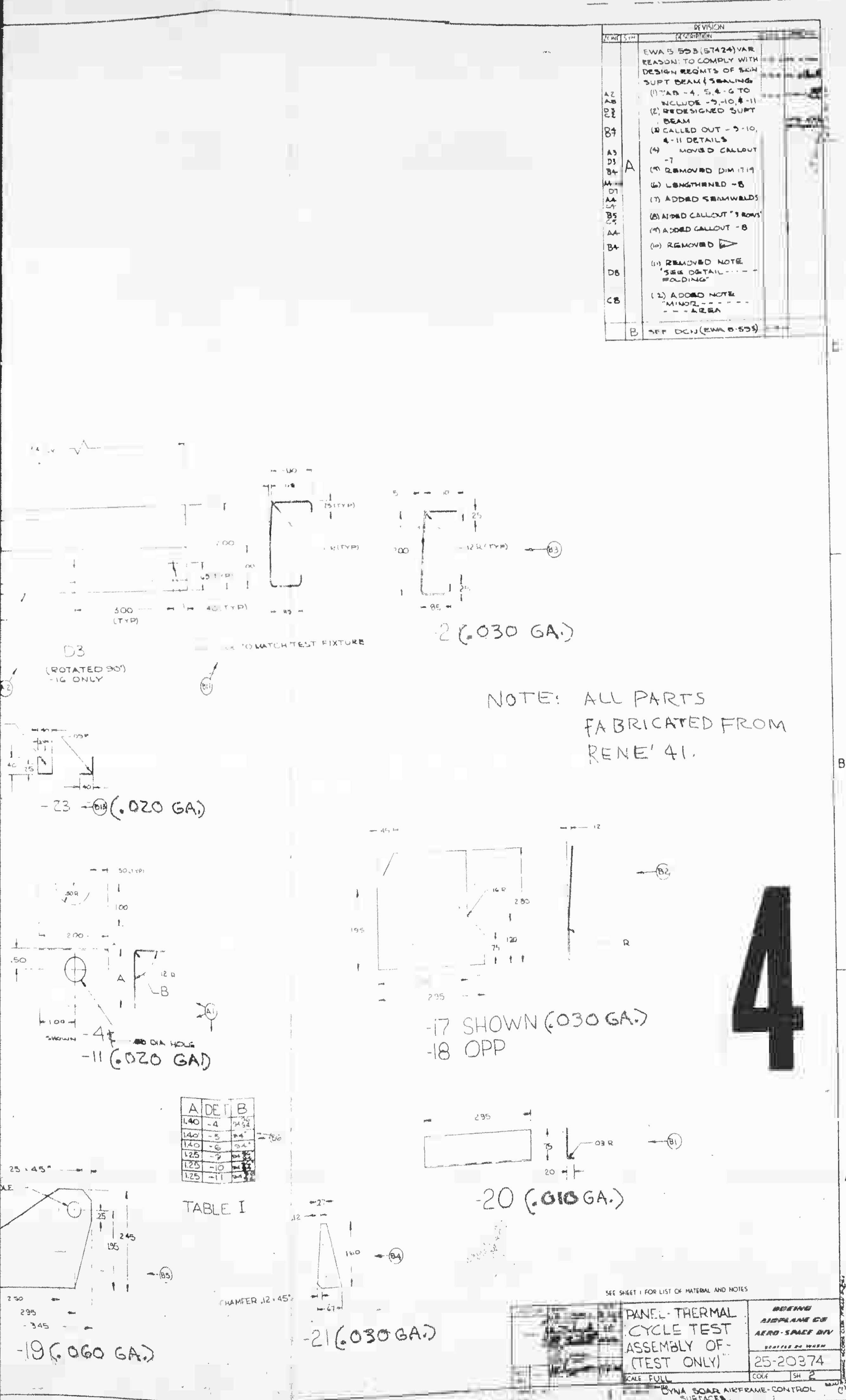
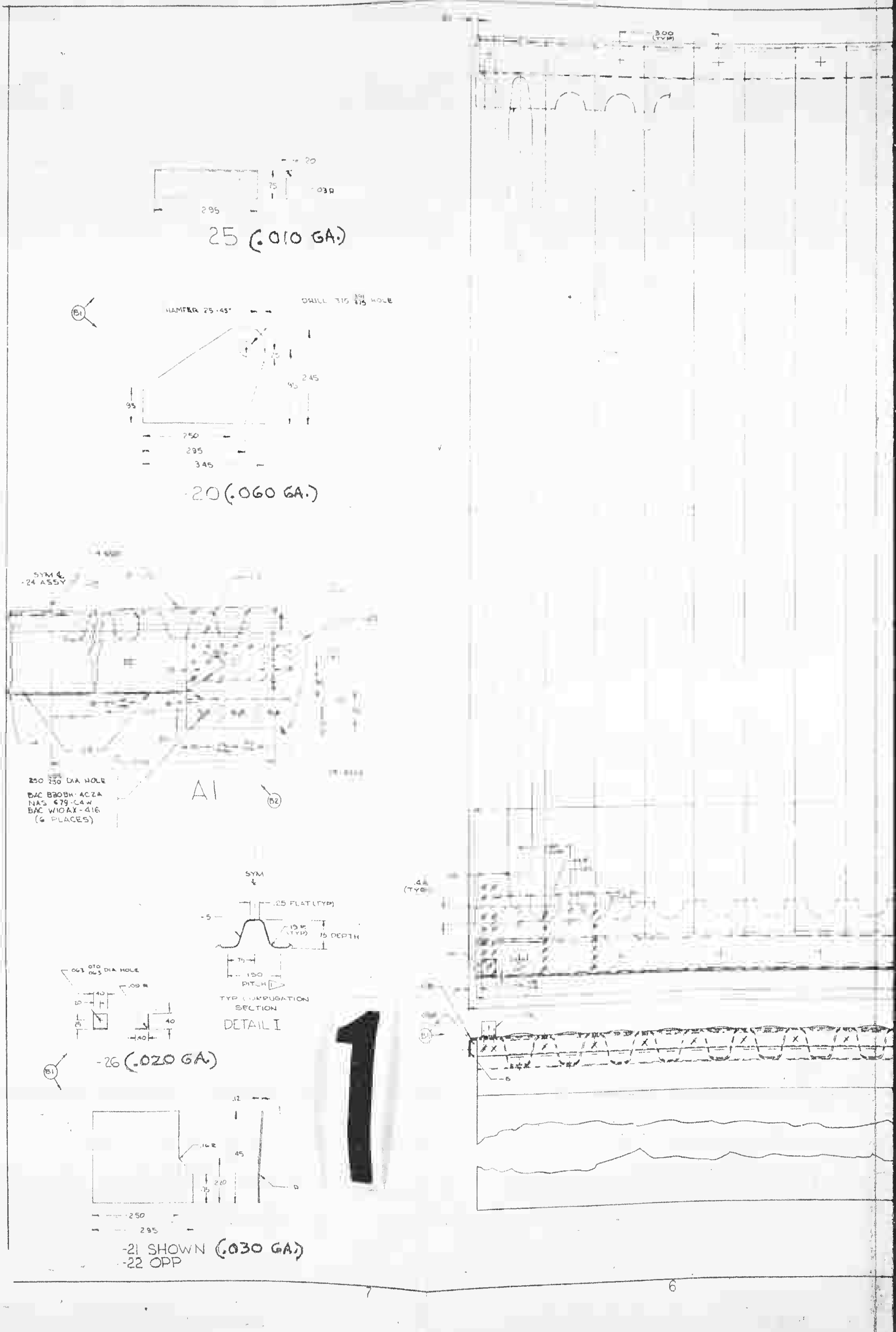
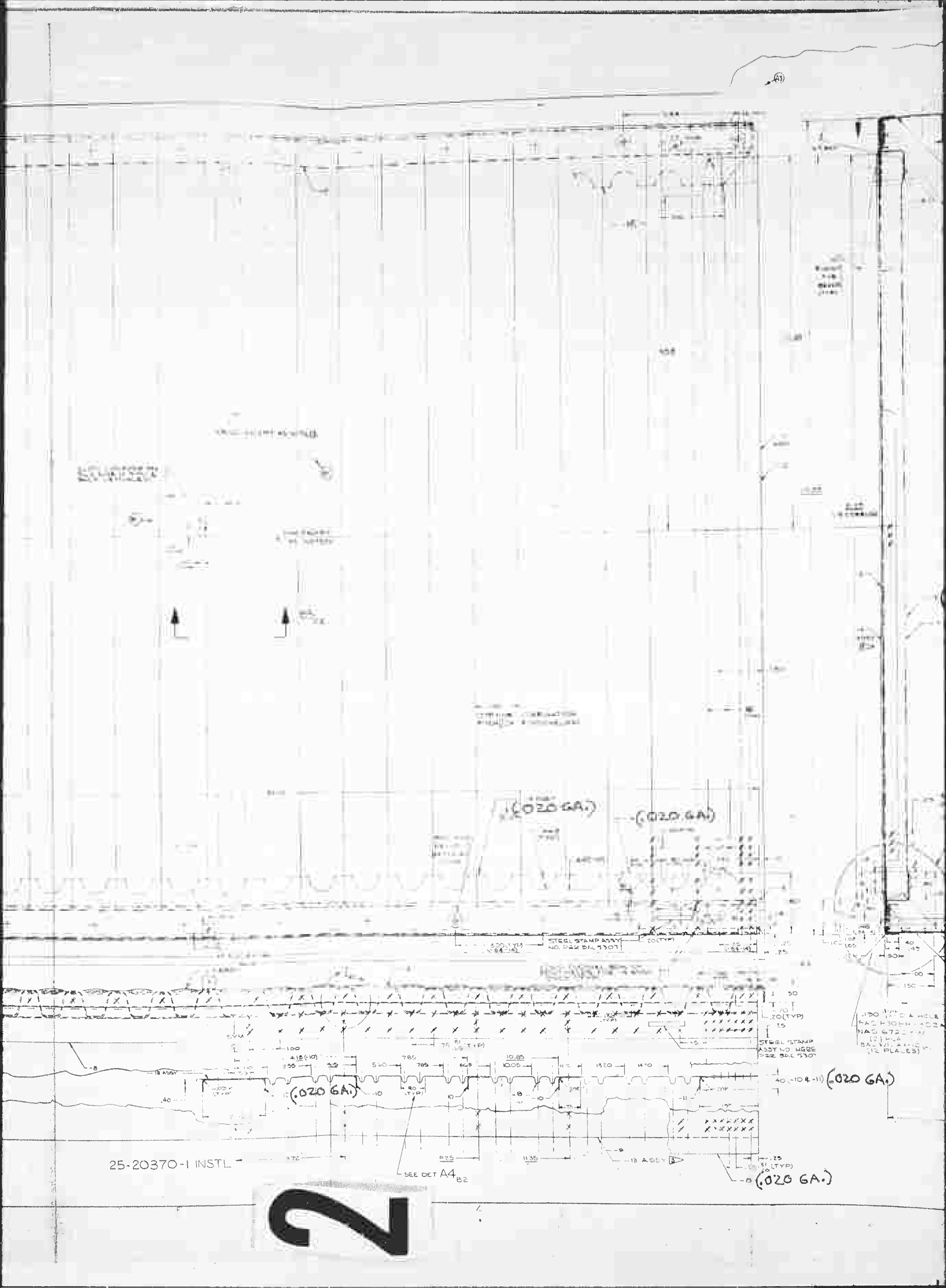


FIG. 231

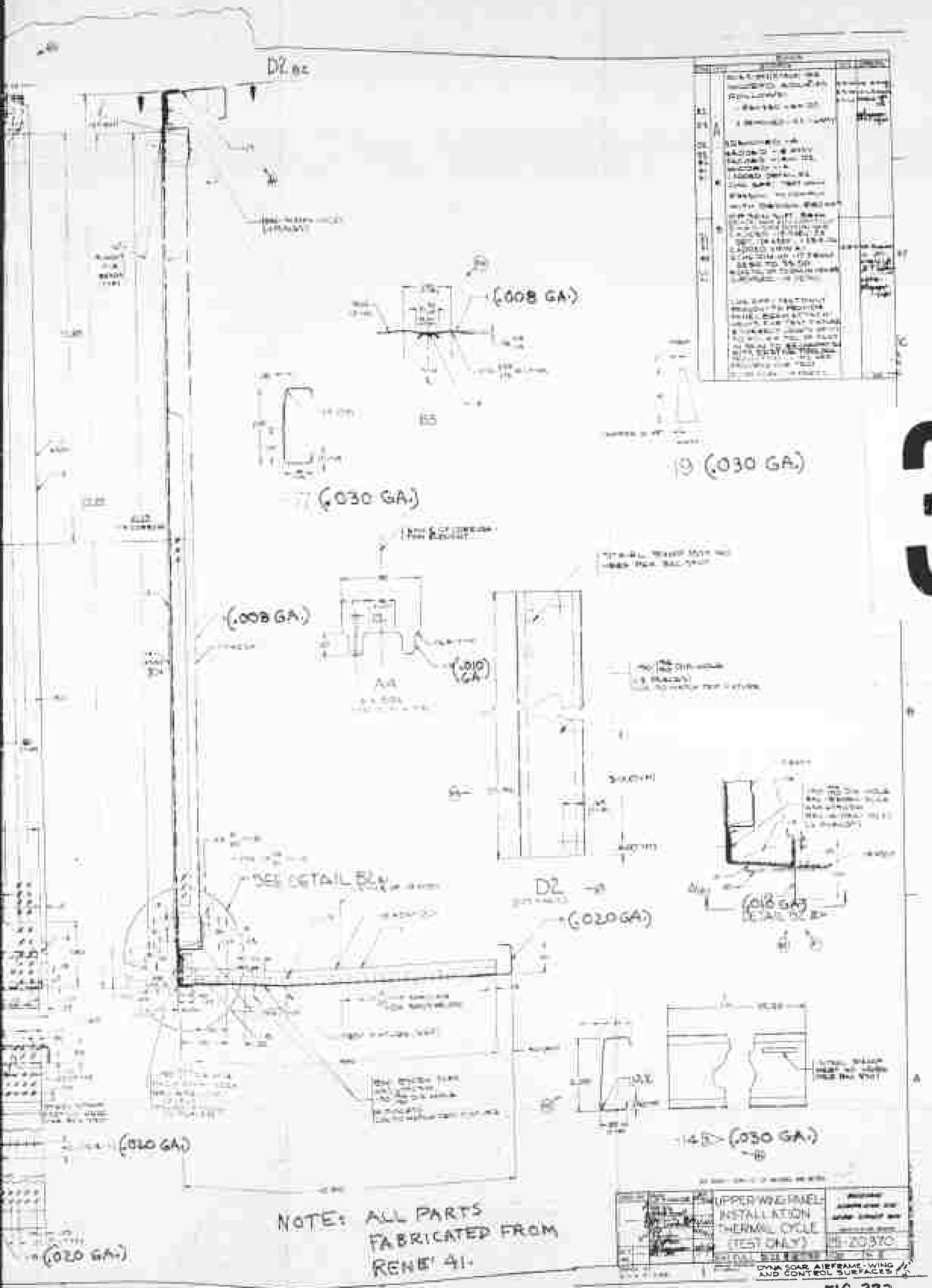
52-50374 SHT 2

ENGR. VAULT


25 (.010 GA.)
-20 (.060 GA.)
SYM ℄
-24 ASSY
DIA HOLE
BAC B30BH-4C2A
NAS 679-C4W
BAC W10AX-416
(6 PLACES)
A1
SYM ℄
.25 FLAT (TYP)
.15 DEPTH
PITCH
TYP CORRUGATION
SECTION
DETAIL I
DIA HOLE
-26 (.020 GA.)
-21 SHOWN (.030 GA.)
-22 OPP
1
7
6

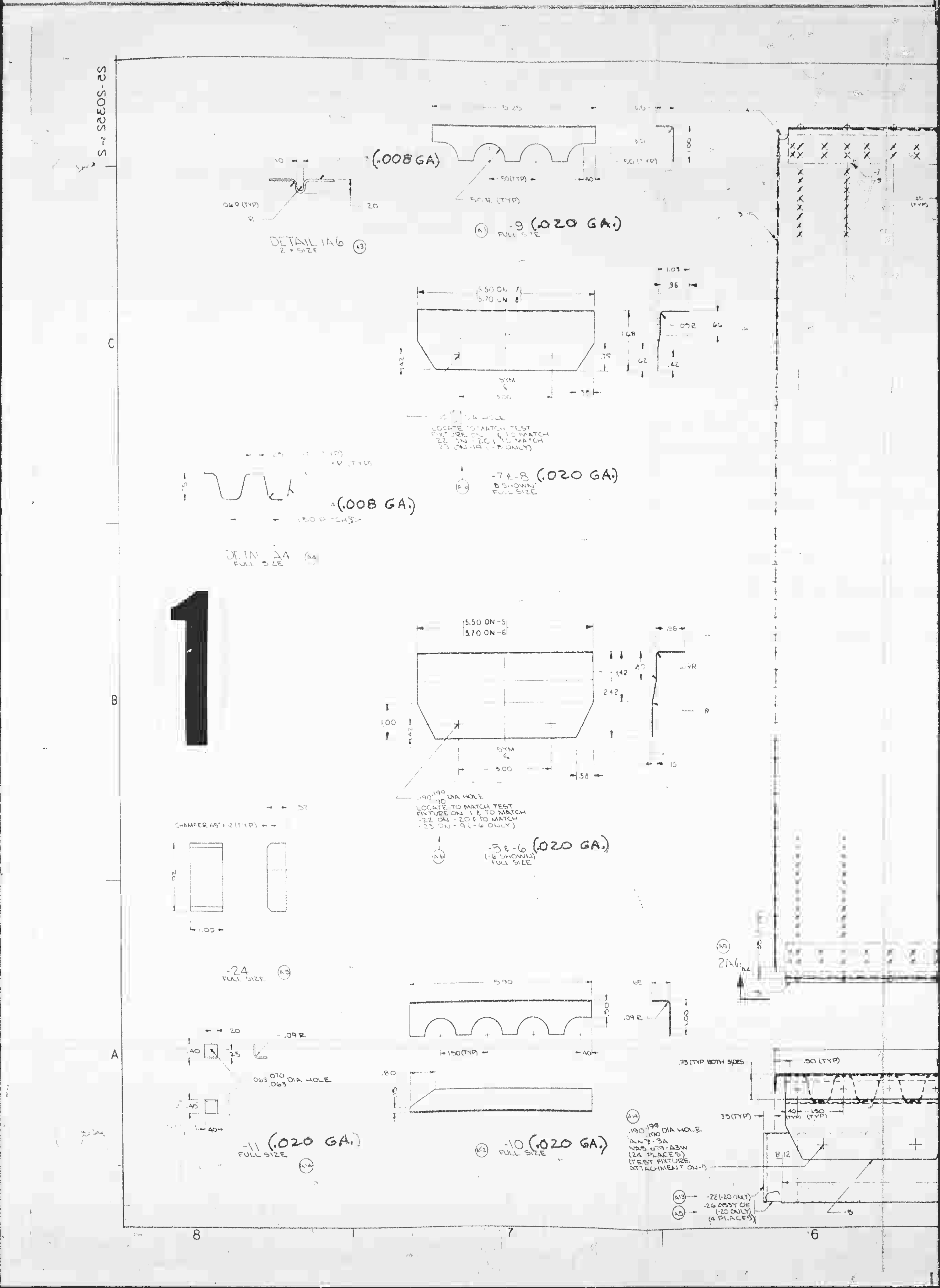


(.020 GA.)
(.020 GA.)
STEEL STAMP ASSY NO. P22 BAC 5307
20(TYP)
STEEL STAMP ASSY NO. HERE P22 BAC 5307
(12 PLACES)
(.020 GA.)
(.020 GA.)
25-20370-1 INSTL
SEE DET A4 B2
-13 ASSY
-8 (.020 GA.)
2



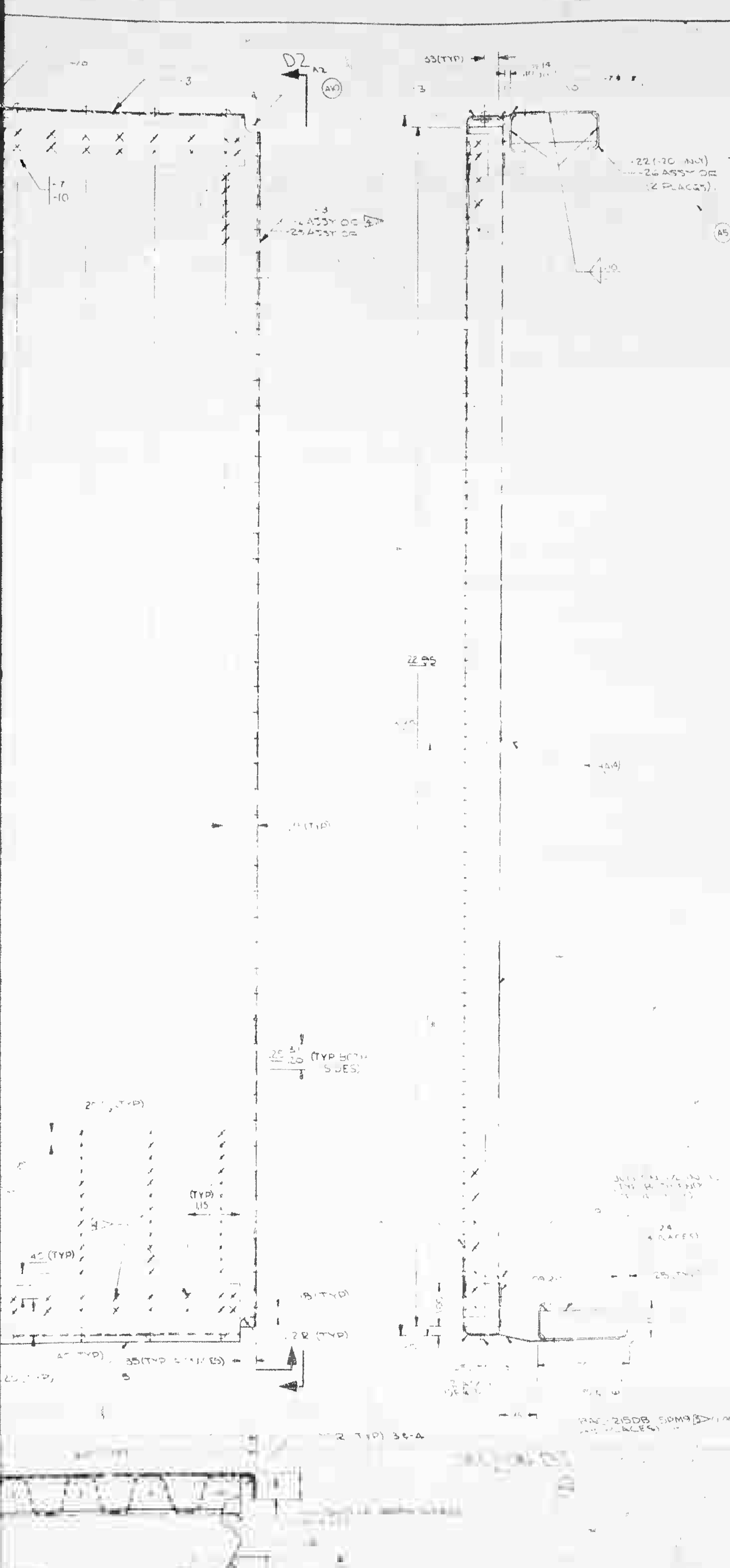
D2
(.008 GA.)
(.030 GA.)
19 (.030 GA.)
3
(.008 GA.)
(.010 GA)
A-A
D2
SEE DETAIL B2
(.020 GA.)
(.018 GA.)
DETAIL D2
(.020 GA.)
14 (.030 GA.)
(.020 GA.)
NOTE: ALL PARTS FABRICATED FROM RENE' 41.
UPPER WING PANEL INSTALLATION THERMAL CYCLE (TEST ONLY)
DYNA SOAR AIRFRAME-WING AND CONTROL SURFACES

FIG. 232



(.008 GA)
DETAIL 1A6
2 X SIZE
-9 (.020 GA.)
FULL SIZE
5.50 ON -7
5.70 ON -8
LOCATE TO MATCH TEST FIXTURE
-7 & -8 (.020 GA.)
-8 SHOWN
FULL SIZE
(.008 GA.)
5.50 ON -5
5.70 ON -6
.190-.199 DIA HOLE
LOCATE TO MATCH TEST
FIXTURE ON -1 & TO MATCH
-22 ON -20 & TO MATCH
-23 ON -9 (-6 ONLY)
-5 & -6 (.020 GA.)
(-6 SHOWN)
FULL SIZE
CHAMFER 45° x .12 (TYP)
-24
FULL SIZE
-11 (.020 GA.)
FULL SIZE
.063-.070 DIA HOLE
-10 (.020 GA.)
FULL SIZE
.190-.199 DIA HOLE
AN 3-3A
NAS 679-A3W
(24 PLACES)
(TEST FIXTURE
ATTACHMENT ON -1)
.73 (TYP BOTH SIDES)
.50 (TYP)
-22 (-20 ONLY)
-26 ASSY OF
(-20 ONLY)
(4 PLACES)
8
7
6
C
B
A

2
1.50
SPOTWELDS (TYP)
ASSEMBLY OF
FULL SIZE



REVISION			
SYM	DESCRIPTION	DATE	APPROVAL
A	REG DCN DATED 1-23-61		

NOTE: ALL PARTS FABRICATED FROM RENE' 41 EXCEPT -22, -23 & 24. THESE PARTS WERE 4130 STEEL.

SEE SHEET 1 FOR LIST OF MATERIAL AND NOTES

PANEL ASSEMBLY-UNINSULATED (TEST ONLY)

BOEING AIRPLANE CO
AERO-SPACE DIV
SEATTLE 24 WASH

25-20352

SCALE NOTED

DYNA SOAR AIRFRAME - WING AND CONTROL SURFACES

FIG. 233

UNCLASSIFIED

UNCLASSIFIED